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ARNOLDIA



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BULLETIN OF POPULAR INFORMATION

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# ARNOLDIA



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of the Arnold Arboretum, Harvard University

VOLUME 25

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NUMBER 1

## GERMINATION OF WOODY LEGUME SEEDS WITH IMPERMEABLE SEED COATS

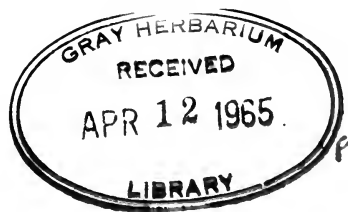
**F**OREMOST in the chain of events that lead to seed germination is the imbibition of water. Many types of seeds will germinate as soon as they are provided with a favorable environment of moisture, air and warmth. Other sound seeds are prevented from doing so by various barriers such as the inability of water to penetrate seed coats, internal physiological conditions, or a combination of these factors (Arnoldia, 20 (6): 33-40. 1960). Germination of many seeds is retarded only by impermeable coats which hinder the admission of water. If these coats are not subjected to pretreatment, germination can be erratic and prolonged, sometimes extending over a period of many years.

Some examples of impermeability of seed coats to water are indicated by the following tests now in progress at the Arnold Arboretum (Plate I, upper half).

In April 1963, three hundred seeds of *Gymnocladus dioica*, Kentucky Coffee Tree, were immersed in a tray of water which was kept at room temperature and changed periodically. Each week the seeds were examined, those which germinated were removed, and the fact recorded. In the first ten days thirteen seeds swelled, produced radicles and were removed. These, no doubt, had fissures in their seed coats at the outset. Twenty-one months later in January 1965, three more seeds imbibed water and extended their radicles; up to March 15, 1965 nothing further has happened. As it now appears, this test can go on indefinitely, possibly for a decade or more; only one per-cent germination has taken place during the past twenty-one months.

In December 1963, one thousand seeds of *Gleditsia triacanthos*, Honey-Locust, were also submerged in water in order to record the germination. In the first thirteen days twenty seeds had germinated and the occurrence was recorded. During 1964, fifteen germinated and so far this year (to March 15) none has done so. The duration of this experiment could also continue for many years. In nature, dispersal of honey-locust seeds takes place in winter. Pods which are firmly

[ 1 ]



attached to the tree require high winds to tear them loose with the result that they can be found lodged against obstacles considerable distances from the parent plant. During winter, crows can be seen tearing pods from the tree, holding them between their feet and ripping them apart to eat the seeds. It is quite probable that the seed coats of any which pass through the birds' digestive tract will be prepared for germination by the grinding action of the gizzard plus the effect of digestive acids.

When seeds with impermeable coats reach maturity, the seed coats, which will provide protection for the contents, start undergoing changes in structure. Seeds of *Albizia julibrissin rosea* were collected in autumn when the pods were turning from green to buff color, indicating ripeness. At this stage the coats consisted of a thin, soft membrane. Fifty seeds weighing 5.12 grams were placed in dry storage, during which changes took place involving the seed coat structure and a reduction in weight and size. Within a week or two the seeds were much smaller, had stony-hard, water-impermeable coats and their weight had diminished to 1.75 grams.

Seeds which nature has furnished with these water-tight protective encasements have the ability to retain viability for remarkably long spans of time when conditions unfavorable to germination exist. When locked up in this manner respiration takes place at such a low rate that life can continue for extended periods. The term *macrobiotic* has been used to define seeds capable of remaining alive for fifteen years or more.

*Albizia julibrissin* furnishes a good example of a plant which produces macrobiotic seeds. Last year, 1964, a few were taken from one of our own herbarium specimens that had been prepared in 1897. These were treated with hot water, as described below, and one germinated after being kept for sixty-seven years under the driest possible conditions—that of an herbarium. Another example of extended vitality is provided by seeds of the same species collected in China in 1793 and stored in a box at the British Museum of Natural History in London. As a result of an air-raid in 1940, they were soaked by water during a fire and were reported to have germinated after 147 years of dry storage. How much longer these particular seeds might have sustained life will never be known. However, long range testing programs for such seeds have been established whereby future generations will have accurately recorded material with which to compile such data. One set of trials, involving seeds stored at the Rancho Santa Ana Botanic Garden, Claremont, California, is planned with a series of tests that will not terminate until the year 2307.

### Methods of Overcoming Seed Coat Dormancy

To obtain prompt germination of seeds characterized only by seed coat dormancy, a rapid means of effecting the entry of water is necessary. Several procedures will accomplish this.

### Mechanical treatment

Large seeds, in small quantities, can be perforated with a knife, file or any tool that performs the job. Seeds large enough to hold between the fingers can be easily prepared for the entry of water by scraping them along the uppermost edge of a three-cornered file placed on a bench. Several brisk strokes are usually sufficient to cut through the seed coat if the file is sharp. Seeds too small to hold, or those handled in volume, can be treated with one of the methods next described or by mechanical scarification. Specially designed equipment is made for users who process large quantities, but individuals, or organizations such as the Arnold Arboretum, do not normally handle seeds in sufficient amounts to warrant the employment of such aids.

### Hot water treatment

Treatment with hot water involves placing the seeds in a container and pouring water heated to a temperature of about  $190^{\circ}$ – $200^{\circ}$  F. over them. The seeds are then left in the water overnight. In amount, the water should be at least five or six times the volume of the seeds, and this is important, as too small a quantity can cool before it has the desired effect. On being removed from the water, the seeds are sown at once, without being allowed to dry out. A second, but less effective method, is to sow the seeds and pour boiling water over the seed-pan or seed-flat.

In the case of the fifty seeds of *Albizia julibrissin rosea* described above, which were collected, weighed and kept in dry storage, the seeds were treated with hot water one afternoon and by the following morning had resumed their original size, weighed 5.42 grams, and were ready for germination.

### Concentrated sulphuric acid treatment

Some seeds with coats not responsive to hot water treatment can quickly be germinated after a more drastic measure — immersion in concentrated sulphuric acid, ( $\text{H}_2\text{SO}_4$ ). This highly corrosive substance, when employed for this purpose, accomplishes in hours, or portions thereof, a process that could require months or years if the seed coats were not treated.

Sulphuric acid treatment, when dealing with small amounts of seeds, consists of placing the dry seeds in a glass container and carefully pouring acid over them until they are covered. Sulphuric acid is a viscous substance of high surface tension which acts superficially on seed coats without penetration. In fact when trials were carried out on an unfamiliar subject suspected of having an impermeable seed-coat, periods of acid treatment as long as one and one-half hours have been given seeds which later proved to be water permeable. Despite such mistreatment, however, the seeds were not destroyed but germinated when sown. The acid did not have the ability to penetrate the seed coat, although water did.

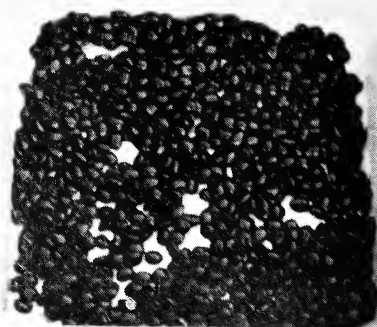
As acid treatment progresses gummy by-products of corrosion will fuse the

541-63 30 APR '63

1570-63 20 DEC '63



GYMNOCLADUS DIOICA



GLEDITSIA TRIACANTHOS



*Albizzia julibrissin rosea*  
Hardy Silk Tree  
Hot Water Treatment  
Germ. 10 days



# PLATE I

(Upper) Seed of *Gymnocladus dioica* and *Gleditsia triacanthos* immersed in trays of water at room temperature. (Lower) Germinated seed of *Albizzia julibrissin rosea* after treatment with hot water.



seeds into a cohered mass which must be separated from time to time to insure that all seeds are acted upon uniformly. Cautious prodding and careful stirring with a glass rod will accomplish this. The length of treatment varies greatly, depending upon the subject, the objective being to corrode away sufficient seed coat to permit the entry of water without exposing the interior to destruction by the acid. Observations can be made during treatment by removing a few seeds, rinsing them and examining the seed coat to see how much of it has been eaten away. When treating large batches it is advisable to run a few trial lots to determine proper timing before processing the main bulk. An important point which must be considered when using sulphuric acid is the effect of temperature. Higher temperatures accelerate the rate of action while lower ones retard it. Acid treatments at the Arnold Arboretum are usually performed in the winter when room temperature is maintained at approximately 70° F.

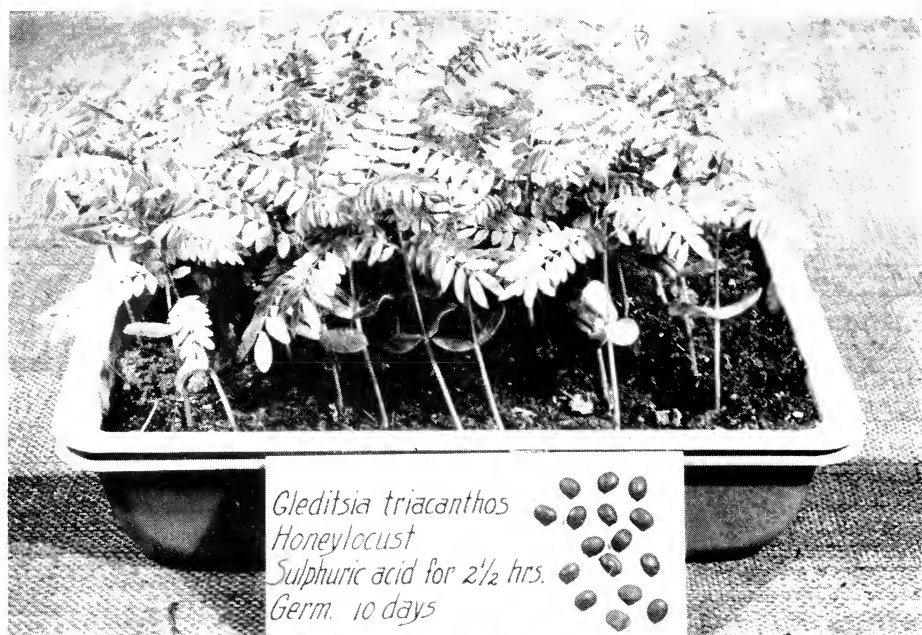
On completion of the treatment, seeds are placed in a sieve and washed thoroughly in running water for several minutes to remove all the acid. Now they are ready for the next step, which involves either immediate sowing or cold stratification. We do not employ a neutrilizer after the use of acid and have never noticed detrimental effects for not having done so.

A few years ago we conducted trials with seeds of *Albizia julibrissin rosea*. Concentrated sulphuric acid treatments were run at room temperature, for half an hour, one hour and two hours. Each test resulted in general germination after ten days, the longer treatments being neither beneficial nor detrimental. Immersion in hot water was also tried and this proved to be the simplest method of germinating *A. julibrissin rosea*. It too produced general germination in ten days with time saved, and the precautions involved, when working with acid, avoided (Plate I, lower half). This test, however, shows that it is not necessary for timing to be exact when using acid on this particular subject. Although it is always wise to strive for precision, acid treatment has a degree of latitude that makes it a relatively easy tool to use.

Similar tests have been carried out on Black Locust, *Robinia pseudoacacia*, and here too, hot water proved to be more effective. After being processed, as shown in the following table, the seeds were placed in trays of water so that the percentage which had imbibed water could be observed and recorded:

<i>Treatment</i>	<i>Imbibition</i>
Control, placed in tap water	2%
Hot water (190° F.)	93%
Acid for one half hour	14%
Acid for one hour	21%
Acid for two hours	33%

The figures for two separate trials were roughly the same. However, because there can be variation from tree to tree and year to year it should be mentioned



## PLATE II

(Upper) Germinated seed of *Gleditsia triacanthos* after treatment with concentrated sulphuric acid. (Lower) Trays sown with seed of *Cercis siliquastrum*: on the left, seed treated only with hot water; on the right, seed treated with hot water followed by cold stratification.

that the seeds used for both trials came from the same tree in the same year.

In other cases acid proved more effective than hot water. Seeds of *Gleditsia triacanthos*, Honey-Locust, required relatively long periods of acid pretreatment to effect a rapid, general germination (Plate II, upper half). The results are shown in the following table:

<i>Treatment</i>	<i>Germination</i>
Control, sown without pretreatment	5%
Steeped in hot water (190° F.) as described	29%
Steeped in sulphuric acid for 1½ hours	62%
Steeped in sulphuric acid for 2½ hours	98%

Similarly, in the case of a shrubby legume, *Cytisus nigricans*, the Spike Broom, seeds treated with hot water and sown, remained in the greenhouse for fourteen months. They were removed from the seed-pan and treated with sulphuric acid, after which a general germination took place in ten days.

### Precautions when handling sulphuric acid

Precautions to be taken when handling sulphuric acid cannot be over emphasized. It need not be feared, but should be handled with the greatest respect, for it becomes safe to use only when adequate precautions are observed. Each year millions of tons of this highly essential industrial chemical are transported about the country in tank-cars and tank-trucks. It is used extensively by chemists, industrial workers and students and with care others can do the same.

In our treatments, small though they are, the workman performing the task dons protective equipment consisting of glasses, neoprene gloves and an apron. The work is done adjacent to running water and nearby is a shower that could be reached in a few seconds if its use became necessary, for, despite precautions, accidents are always possible. To minimize the chance of breakage, our supply of acid, in a one gallon glass container, is imbedded in a five gallon can of perlite stored in an out-of-the-way location.

When treatments have been completed, the acid which has been used is poured into a glass bottle. In a few days extraneous substances caused by corrosion settle to the bottom and the clear acid is then poured off for reuse.

### Cold stratification

Some seeds of woody legumes are in the category known as doubly dormant, or two year seeds, and require two stages of pretreatment before general germination takes place. After water has penetrated the seed coats, and broken the first dormancy, a period of cold is necessary to overcome physiological barriers within the seed that prevent germination. Stratification is the term commonly used to define treatment of seeds by combinations of time and temperature; in this case, cold stratification.

At the Arnold Arboretum, pretreatment of seeds requiring stratification is done by enclosing them in polyethylene bags. Polyethylene film has the property of being air permeable yet vapor proof; with the result that oxygen is available to the contents by diffusion, together with the moist environment which is essential for stratification to be effective. Stratifying media may consist either of sand or a combination of half sand and half peat moss. The medium to be used is dampened, and emphasis should be placed on the word dampened, for wet soggy material could exclude sufficient oxygen. In proportion the medium should not exceed two or three times the volume of seeds. This too is important, for at sowing time the entire content of the bag is sown and too large an amount would result in some seeds lying at unfavorable depths. The seeds are distributed throughout the medium and placed in the bag which is twisted at the mouth and made vapor tight with a rubber band.

Bags of seeds needing pretreatment by cold are placed, for the required time, in a refrigerator set at about 40° F., but any temperature at which a household refrigerator is normally set would be satisfactory. After the required period of stratification the contents of the bag are sown and rapid germination should follow.

Woody legume seeds characterized by double dormancy are found in *Cladrastis lutea*, and in *Cercis canadensis*, *C. chinensis*, *C. griffithii* and *C. siliquastrum*. Plate II, lower half, demonstrates the importance of cold stratification, after water has been imbibed, before general germination can take place. In this example *Cercis siliquastrum*, Judas Tree, seeds were divided into two equal lots and treated with hot water. That on the left of the figure was sown without further attention while the other was provided with a cold period at 40° F. The latter produced a complete germination in twenty-one days while, after eight months, only ten seedlings appeared in the first lot.

One cannot generalize when considering seed dormancies; species differ even within the same genus. In *Cladrastis*, for example, we find that *C. lutea*, American Yellowwood, requires cold stratification after water has permeated the seed coat, while *C. platycarpa*, Japanese Yellowwood, produces a 98% germination in seven days when sown after its coat is modified with sulphuric acid. To find entirely different germinational behavior among species of the same genus is not uncommon, and even between seeds of different provenance within the same species.

To sum up, one may say that woody legume seeds often possess impermeable seed coats which require treatment before germination can take place. This may be provided, as explained, by scarification or by exposing them to hot water or concentrated sulphuric acid. Even then some seeds possess an internal dormancy which can only be broken by cold stratification after mechanical treatment, or the use of hot water or acid.

ALFRED J. FORDHAM



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## ALASKAN ORNAMENTALS AND FRUITS

**A**LTHOUGH Alaska is still considered by many to be a land of ice and snow, the frost free period in the more populated areas of the state is similar to many areas of the continental United States. It ranges from about 95 to 100 days in the Tanana Valley to 110 in the Matanuska Valley, and much longer in south-east Alaska, whose climate is similar to coastal Washington. Vegetable gardening is successful as far north as the foothills of the Brooks Range well north of the Arctic Circle. The day length in the Cook Inlet area, which is the most heavily populated area of the state, varies from about 5 hours and 20 minutes in late December to 19 hours and 20 minutes in June. The extremes are much greater further north, as in Fairbanks, where a baseball game is always played on June 21 at midnight. Due to a favorable rainfall-evaporation ratio, and the fact that most of the precipitation comes in the growing season, it is possible to produce a wide range of crops with a desert-type precipitation of 14.5 inches in the Matanuska Valley and two inches less in the Fairbanks area. Some parts of south-east Alaska have in excess of 195 inches some years. Alaska is generally characterized by cool evening temperatures although during the day they may reach almost 100° F. in the interior. The long photoperiod and low evening temperature are credited for the production of cabbages weighing 50 lbs. and delphiniums 10 ft. high. Flower colors are considered to be more intense than in the "south 48"—the rest of the United States—under these favorable conditions. The temperature extremes in the Matanuska Valley are about 85° F. in summer and -37° F. in winter, neither of which are reached very often. In the northern interior they may range from 100° to -75° F.

In the more populated areas there is considerable interest in landscaping and the utilization of woody materials adapted to the conditions in Alaska. Most newcomers to the state will not believe that they cannot grow the same evergreens, trees and shrubs that they cultivated before they came to Alaska, and they spend a lot of money learning the hard way. Many of the best adapted materials are considered too poor in quality to be grown in the "south 48" and are usually not available from stateside sources. Other difficulties are the use of

hardy scions on non-hardy rootstocks, and the selection of strains from the southern instead of northern parts of a plant's range. These problems are especially noticeable in *Rosa* and *Malus*.

### Ornamental Trees and Shrubs

TANANA VALLEY. This is the coldest of the populated areas in which there is much interest in ornamentals. The following are found to be adapted varieties of trees, shrubs and roses:

Trees (In addition to the native birch, poplar, larch and spruce)

<i>Acer negundo</i>	<i>Prunus padus</i>
<i>Malus baccata</i> (no named varieties or hybrids have been found to be hardy in this area)	<i>Sorbus americana</i> <i>Ulmus japonica</i>

Shrubs

<i>Caragana arborescens</i>	<i>Prunus japonica</i>
<i>C. pygmaea</i>	<i>Sorbaria sorbifolia</i>
<i>Cotoneaster lucida</i>	<i>Spiraea media</i> var. <i>sericea</i>
<i>Juniperus horizontalis</i> selections	<i>Syringa villosa</i> , and hybrids
<i>Potentilla fruticosa</i>	<i>Viburnum trilobum</i>

Roses

<i>Rosa rugosa</i>	'Hansa'
'Butterball' and other types of <i>R. spinosissima</i>	'Thérèse Bugnet'

MATANUSKA VALLEY-ANCHORAGE AREA. Those listed above for the Tanana Valley as well as the following. Those designated with an asterisk require special sites and protection:

Trees

* <i>Abies balsamea</i>	<i>Pinus aristata</i>
<i>Betula pendula</i> 'Dalecarlica'	* <i>P. contorta</i> var. <i>latifolia</i>
* <i>Crataegus chlorosarca</i>	<i>P. mugo</i>
<i>C. rivularis</i>	<i>Populus</i> "Griffin Poplar"
<i>C. succulenta</i>	<i>Populus</i> "Northwest Poplar"
<i>Fraxinus pennsylvanica</i> var. <i>lanceolata</i>	<i>Prunus maackii</i>
<i>Larix decidua</i>	<i>P. virginiana</i>
<i>L. sibirica</i>	<i>P. virginiana</i> var. <i>demissa</i>
<i>Malus</i> - see below under Crabapples	<i>Sorbus americana</i>
* <i>Picea pungens</i>	<i>Sorbus scopulina</i>
* <i>P. sitchensis</i>	<i>Ulmus pumila</i>

Crabapples

'Almey'	'Makamik'
'Anaros'	'Osman'
'Dauphin'	'Robin'
'Dolgo'	'Rudolph'
'Haralson'	'Silvia'

## Crabapples (cont.)

- \*'Heyer 12'
- 'Hopa'
- 'Jacques'

## Shrubs

- Acer ginnala*
- A. glabrum* var. *douglasii*
- Amelanchier alnifolia*
- Berberis koreana*
- Caragana frutex*
- \**C. frutex* 'Globosa'
- C. jubata*
- C. microphylla*
- Coloneaster intergerrima*
- C. melanocarpa*
- \**Juniperus scopulorum*
- Lonicera coerulea*
- L. korolkowii*
- L. korolkowii* var. *zabelii*
- L. spinosa* var. *albertii*
- L. xylostemon* 'Claveyi'
- \**Philadelphus lewisii*

## Roses

- \**Rosa foetida* var. *bicolor*
- R. laxa*
- R. rubrifolia*
- R. woodsii*
- R. spinosissima* var. *altaica* "double form"
- 'Alysham'
- 'Belle Poitevine'
- 'Betty Bland'
- 'Betty Bugnet'

- 'Strathmore'
- 'Sutherland'
- and others

- Physocarpus monogynus*
- \**Prunus besseyi*
- \**P. fruticosa*
- \**P. triloba*
- \**Rhododendron schlippenbachii*
- \**R. species* and hybrids
- Ribes alpinum*
- Spiraea billiardii*
- S. trichocarpa*
- S. trilobata*
- Symphoricarpos orbiculatus*
- \**Syringa* × *chinensis*
- S. × henryi*
- S. josikaea*
- \**S. vulgaris*, French hybrids
- Viburnum lantana*
- V. lentago*

- 'Blanc Double d'Coubert'
- 'Dr. Merkeley'
- Hansen Hedge Rose
- \*'Harrison's Yellow'
- 'Helen Bland'
- 'Mrs. Mina Lindell'
- 'Ruth'
- 'Tetonkaha'
- 'Wasagaming'

## Bush Fruits

Many of the cultivated raspberries are suited to both the Tanana Valley and the Cook Inlet area. 'Latham' and 'Chief' are among the commonest varieties. The cultivated gooseberries and currants are not quite hardy enough for the interior, but varieties such as 'Pixwell' and 'Red Lake', and a number of black currants, do well further south in Matanuska Valley and Anchorage area. The Kenai peninsula appears to be one of the best localities for small fruits. None of the cultivated blueberries appear to be hardy anywhere in the northern part of the state although native species are widely distributed. *Amelanchier alnifolia* makes a very satisfactory substitute. The only adapted strawberry widely available is known as the 'Sitka Hybrid'. Most of the stateside varieties are not quite hardy enough to survive consistently.

## Annual Flowers

Most of the annuals, except those with a high temperature requirement, do well when set out as transplants. Some of the larger zinnias are the only common annuals not widely grown. Calendulas, poppies, sweet-peas and nasturtiums are among the few that are seeded out of doors. The disease, aster yellows, is unknown, so far, so the asters are especially fine with no treatment of any kind except the addition of water and fertilizer.

## Perennials

Although Alaska is probably most famous for its long-lived 8 to 10 foot delphiniums many others do well, though they do not reach the extreme height of these giants. Some of those which are well known elsewhere are columbine, pyrethrum, monkshood, trollius, centaurea, shasta daisy, day lilies, peonies (including Japanese varieties), rudbeckia, oriental poppy, campanulas, Siberian iris and many lilies. Tulips and daffodils do well from Matanuska Valley to the south.

## Hazards to Production of Ornamentals and Fruits

Even in the hardest woody materials more problems are found in a winter of heavy snowfall than in a mild one with practically no snow. When the snows pile up in the mountains the moose descend to the valleys and eat the terminals on many of the well-adapted shrubs and trees. Among their favorites are the poplars, birches and, especially, the apples. But they seldom prune in a desirable manner; they may stand up on their hind legs and break down the center of a tall tree just to get the tender terminal growth. Unfortunately, this winter also, the mice were active under the snow, so that some six-foot trees were entirely debarked from the ground level to the tip of their branches. After no trouble for eight years it looks as though we shall have to go back to hardware cloth and poisoned grain. Porcupines seem to confine their feeding to raspberry canes. Insects and disease are not very serious, compared to the problems they cause with ornamentals in other areas. A number of vector aphids and leafhoppers are here, but not enough inoculum, so far, to produce recognizable symptoms of disease. Aphids on birches are among the few insect problems which are consistently treated.

The production of ornamentals that are adapted to propagation by layering, hardwood cuttings or from seed is no different than elsewhere. Our short cool growing season, however, involves considerable trial and error in order to get the correct conditions for grafting or for success with cuttings, especially softwood cuttings. The high cost of electricity and fuel may make indoor propagation prohibitive. From the few trials we have made it appears that, although cuttings may root out of doors, it may be necessary to bring them inside, under shelter, for the first winter.

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# ARNOLDIA



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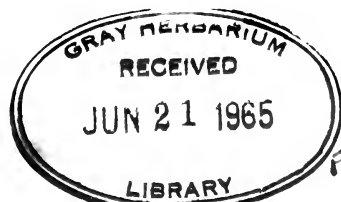
JUNE 11, 1965

NUMBERS 3-4

## THE OLIVE FAMILY IN CULTIVATION

**M**OST people who are interested in plants have some idea of what constitutes a species and are aware that in biological classifications they are grouped together into genera, but it is not so generally known that related genera are brought together to constitute families. The olive, *Olea europaea*, is the species *europaea* in the genus *Olea*, which, together with several closely related genera, make up the family Oleaceae (the suffix -aceae indicating that it is a family). Quite a number of families are readily recognizable, for example, the orchid, grass and daisy families but others are much more diverse in appearance and include plants which would not, at first, be thought of as being related. Such a family is the Oleaceae, containing the lilac, ash, fringe-tree, *Forsythia*, *Osmanthus* and jasmine, to mention a few of the constituent genera.

How big is this family and how is it characterized? The total number of species can only be estimated since much research yet remains to be done, not only in reviewing those species described during the last 200 years, but in examining new material gathered on expeditions to little-known areas of the world, especially in the tropics. One may safely say, however, that altogether there are between 400 and 500 species. The number of genera is even more a matter of opinion but 22 is the most likely figure, which, taken together with the species number, shows that the Oleaceae is relatively small compared with most of the families of flowering plants. Yet it contains many important horticultural plants and few are superficially so diverse, containing, as it does, the colorful lilac, the ash with its inconspicuous wind-pollinated flowers, the bright yellow *Forsythia*, and the starry jasmine. What is it that holds it together? The answer to this is found in the structure of the flowers; experience has shown that related plants can vary widely in their vegetative parts but the characters of the flower are much more stable and, in classification, a surer guide to relationships. In the Oleaceae there is a basic and unique pattern of four sepals on the outside, then four petals, usually joined together, two stamens joined to the petals and then, at the very center,



an ovary with two chambers, each containing two ovules. This is the basic plan and the different exceptions may be looked upon as "variations on a theme".

Although vegetative characters are often unreliable in classification it is worth noting that the olive family is characterized by being woody rather than herbaceous, and having opposite leaves. In size the members may range from small, spreading shrubs, not more than one foot high, to tall forest trees. In addition, some of them are climbers, the best known being the jasmines, and climbing members in tropical rain forests can become very large indeed. Opposite leaves are found throughout the family, with the sole exception of a small, distinctive and closely related group of eight species of *Jasminum* in which they are borne alternately. The Oleaceae is not the only family to possess opposite leaves of course, but this character can nevertheless prove a useful point of recognition.

A remarkable trait in the Oleaceae is the development of adaptations that favor cross and not self-pollination. In many genera the flowers are completely unisexual but in others some plants of a species have hermaphrodite flowers while others have those which are functionally only male or female and have either abortive ovaries or stamens. Other genera, for example *Jasminum*, *Forsythia* and *Abeliophyllum*, are what are known as heterostylous, that is, some individuals bear flowers in which all the styles are long while in other individuals they are all short. In the former, the two stigmatic arms are borne at the mouth of the petal tube, with the stamens at a lower level within; while those of the latter exhibit the reverse condition, the style is short and the stamens are borne at the mouth of the petal tube. Along with this arrangement goes the inability of flowers of one style length to be fertilized by pollen from others of the same type. In order to set seed, long styled flowers must receive pollen from those with a short style and *vice versa*. This means, in the case of cultivated plants, that if only one clone is grown, however much it is propagated, fruit will never, or only very rarely, be produced.

A noteworthy character which recurs frequently throughout the family, and helps to make it one of the most important from the horticultural point of view, is the production of fragrant flowers. Lilac and jasmine jump straight to mind, but *Osmanthus* is equally outstanding (and in fact, its botanical name means 'fragrant flower'). Such flowers also occur in other genera and even the privets are powerfully, if not very sweetly, scented.

### **Abeliophyllum**

This genus contains a single species, *Abeliophyllum distichum*, a native of central Korea. It was introduced into cultivation in America, through the Arnold Arboretum, by means of seed received from Korea in 1924 and forms a shrub with slender, arching branches. It is one of the first plants to flower in the spring and produces a profusion of white blossoms, somewhat smaller but shaped very like those of *Forsythia* (Plate III, upper). In fact, some people have called it the



### PLATE III

(Upper) Flowering branch of *Abeliophyllum distichum* on the left and *Forsythia orata*, the smallest flowered species, on the right. (Lower) Flowering branch of *Chionanthus virginicus*.

white-forsythia, a name which is apt in some respects but could be very misleading. In order to flower well, it requires a sunny position and in the Boston area is quite hardy, but as the flower buds are borne naked throughout the winter, it should not be planted where it will suffer from the severest conditions or where early autumnal frosts are likely to affect the developing buds on unripened wood.

One of the plants at the Arboretum has a tendency to produce pink flowers which, however, fade somewhat on opening. With judicious breeding and selection it might be possible for this color to be deepened and in that way extend the color range of our earliest flowering shrubs.

### Chionanthus

This small genus of three or four species contains the fringe-tree, *Chionanthus virginicus*, a good example of a native North American plant prized in cultivation. Each year in late spring a healthy plant will cover itself with a profusion of delicate flowers giving the shrub the appearance of being covered with fringes of fine white lace (Plate III, lower). The botanical name means "snowflower", an allusion to the abundant white flowers like showers and drifts of snow. *C. virginicus* has a natural range from Florida to Texas, north to New Jersey, Pennsylvania, West Virginia, southern Ohio, southern Missouri and Oklahoma. Although normally seen as a large shrub it can grow into a small tree about 30 feet high and in the opinion of many is one of the most outstanding flowering woody plants.

In addition, an east Asian species, *Chionanthus retusus*, is also known in cultivation. Not always so floriferous perhaps, and with slightly shorter petals, it flowers a little later than *C. virginicus* and, as a handsome plant in its own right, is well worth growing in any collection.

### Fontanesia

There are two very closely related species in this genus, *Fontanesia phillyreoides*, a native of Turkey, and *F. fortunei*, from China. Neither are grown for their flowers, and for this reason perhaps are not widely known in cultivation, but they do produce handsome, much-branched, graceful shrubs with bright green foliage and are very suitable for background planting. The flowers have small greenish-white petals, which are followed, if cross pollinated, by a profusion of single-seeded, winged fruits, oval in shape and about  $\frac{1}{4}$  to  $\frac{1}{3}$  of an inch long.

### Forsythia

Few spring-flowering plants are as well known as the universally admired *Forsythia* with its golden yellow somewhat bell-like flowers, from which is derived the rather contrived "common" name, golden-bells (Plate III, upper). *Forsythia* flowers before the leaves are on the trees, when everyone is longing for signs of spring and an end to the drabness of the last few weeks of winter. The genus contains about seven species, all of them from eastern Asia, except for one, *F. europaea*, which is found wild only in Albania. They are easily propa-

gated from cuttings or by layering, and, partly for this reason, are now widespread in cultivation.

For a full account of the introduction and development of the members of this genus, one should refer to the article by Dr. Donald Wyman, "The Forsythia Story", published in an *Arnoldia* written four years ago (Vol. 21: 35-38. 1961). Sufficient to say here that *Forsythia suspensa* var. *sieboldii* was first introduced to Holland from Japan in 1833 and from the start proved a popular plant. Later, the famous Späth Nurseries in Germany produced a hybrid of this species with *F. viridissima* which was called *F. × intermedia*. Numerous cultivars of this hybrid have been selected and are now widely planted, but more recently, by means of further hybridization and careful cytological treatment, several newer cultivated varieties have been developed. Some, like 'Arnold Giant' and 'Karl Sax' are polyploid and have particularly large, deep-colored flowers, others are diploid and include 'Pallida' and 'Primulina' with flowers which are pale yellow, while others like 'Arnold Dwarf', form low growing shrubs most suitable as a ground covers or bank plants.

### Forestiera

A New World genus of perhaps twenty species of somewhat privet-like shrubs of little ornamental value, but occasionally grown in botanic gardens and other large collections. Most of the species are tropical or warm temperate, but three are hardier than the others and can survive, but do not thrive very well, in the Boston area: *Forestiera acuminata*, *F. neo-mexicana* and *F. pubescens*. The flowers have no petals and are somewhat inconspicuous, with the sexes separate. The fruit is a dark purple drupe, like a very small plum,  $\frac{1}{2}$  inch long or less.

### Fraxinus

This is certainly one of the most important genera in the family, if only for the timber trees it contains. Of the genera characteristic of temperate regions, this is the largest in number of species. In distribution it ranges throughout the Northern Hemisphere and extends southward into the tropics where, in Asia, it reaches as far as Java, and in the New World several species are found in Mexico and the West Indies.

Characterized in particular by the combination of their arborescent habit and pinnate leaves, the species exhibit a great range in floral types. In the so-called flowering or manna ash, *Fraxinus ornus*, a native of south Europe and southwest Asia, and a few other related species, the flowers possess both petals and sepals and are reminiscent of those of *Chionanthus* (Plate IV, upper). In other species there are sepals only, without petals, and in yet others not even any sepals. In addition to this, the flowers are very often unisexual. In consequence of these facts the flowers of most ashes are inconspicuous and often consist of nothing more than naked ovaries, or naked stamens, grouped together in wind-pollinated inflorescencies which are usually produced before the leaves (Plate IV, lower).



**PLATE IV**

(Upper) Flowering branch of *Fraxinus ornus*. (Lower) Flowering branch of *Fraxinus excelsior*.

*F. ornus* and the even hardier species from North China, *F. bungeana*, with their fringe-like, white petaloid flowers ought to be more widely grown as relatively small, handsome flowering trees.

One of the best known characteristics of the ashes is their winged-fruits, or samaras, to give them their technical name. They look so different from either the capsules or the olive-like drupes of other well known members of the family, that, combined with their pinnate leaves and often imperfect flowers that lack petals and even sepals, many people have doubted that they should be classified in the same family. However, to judge from the series of forms in the genus as a whole, the flowers have become apetalous by reduction from the typical basic pattern for the family. Pinnate leaves, the other obvious difference from most Oleaceae are also found in a few other genera, for example *Syringa* and *Jasminum*, while the winged-fruit or samara is also characteristic of *Fontanesia* and *Abelio-phyllum*. In addition, a few ashes are noteworthy in having simple leaves, for example, *Fraxinus anomala* of the southwest U.S.A. and the cultivar 'Diversifolia' of the European ash, *F. excelsior*.

### Jasminum

Containing 200 or more species, this is the largest genus in the family. It is mainly composed of tropical climbers with starlike flowers that possess more than the typical four petals (Plate V, left). None of them are native to the New World and the main center is tropical Asia, both mainland Asia and the islands of the East Indies. However, a few species are found in warm temperate regions and have been cultivated for several centuries.

The best known, perhaps, is the sweet scented, white jasmine, *Jasminum officinale*, a native of the Himalayas and southwest China. Closely related, and also possessing pinnate leaves, is *J. grandiflorum*, the Spanish jasmine, which is less hardy but, as its Latin name implies, tends to have larger flowers. This is the species cultivated commercially in the south of France and from the flowers of which the perfume, Oil of Jasmine, is extracted. Another species with pinnate leaves, somewhat intermediate in hardiness between these two, is the Chinese *J. polyanthum* which makes a wonderful climber with pendulous branches loaded with sweet-scented flowers when grown in the south, or in a cool conservatory, and, even when relatively small, can make a handsome pot plant (Plate V, right).

The hardest member of the genus, is the winter jasmine, *Jasminum nudiflorum*, which has opposite, trifoliate leaves and is particularly well known for its bright yellow flowers which appear during mild spells throughout the winter, in areas that are not too cold. It can even survive and flower in the spring at the Arnold Arboretum, when grown against a building or in similar favorable locations. Very closely related to this species is the primrose jasmine, *J. mesnyi* (*J. primulinum*), which in northern regions has to be treated as a plant for the conservatory or cool greenhouse. When grown as a "standard" it can be outstanding with wide arching and weeping branches covered with large, yellow flowers.

Another group of yellow flowered species contains a number of fairly hardy plants, although none of them are hardy enough for New England. They are characterized by the possession of alternate leaves, the only such examples in the family. The best known of these is the Italian jasmine, *Jasminum humile*, but there is one unusual species which should be singled out for special mention. This is *J. parkeri*, very suitable for cultivation either under glass as a pot plant in an alpine house, or outside as a rock garden subject where the frosts are not too severe. It is a diminutive species, native of a limited area in the eastern Himalayas, and only grows about a foot high. It forms a low mound which spreads and arches over rocks, etc. and has minute pinnate leaves. In the summer it bears small, clear yellow flowers about  $\frac{1}{2}$  inch across, dotted about on the dark green cushion.

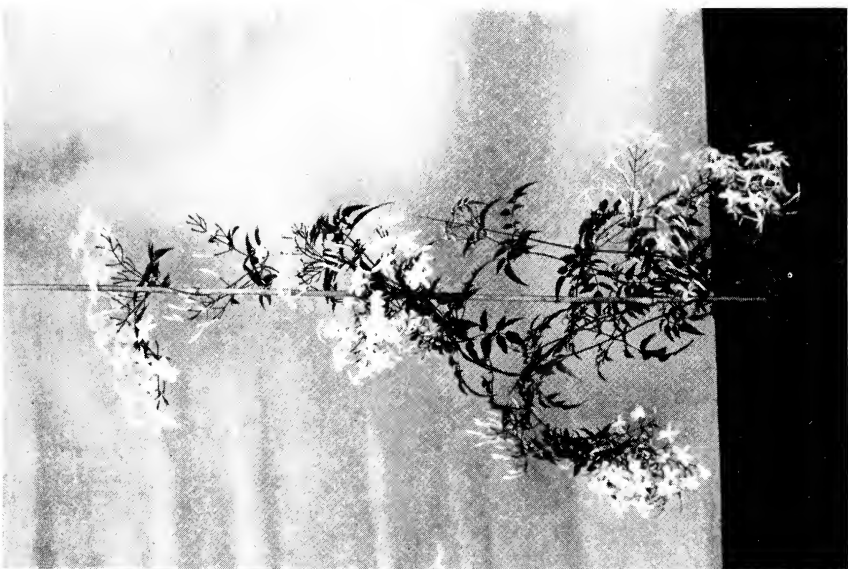
One species, *Jasminum beesianum*, is a weak climber and can be used as a ground cover. It has dull red flowers which, however, are not very prominent, but a hybrid of this species with *J. grandiflorum* has given us *J. × stephanense* a climber with pink flowers. Apart from these, and the yellow flowered species mentioned above, all others in the genus have white flowers, usually more or less starlike, and almost invariably sweetly fragrant. Except for cultivation under glass, they can only be grown in areas where there is no risk of frost. The most famous example is the Arabian jasmine, *J. sambac*, which has been grown and prized for centuries in the Orient. The dried flowers are used for scenting tea in China and, in other parts of the world, the fragrant buds are made up into wreaths and leis. This is presumably the species whose Arabic name is Yâsmîn, the origin of "jasmine" and its Latin form *Jasminum*.

One of the most spectacular of the species in cultivation is *Jasminum rex*, a native of Siam, with large flowers each 2-3 inches in diameter. The broad petals are pure white but the bud and outer surface of the corolla tube is flushed with dark red. Unfortunately these very showy flowers are without fragrance but the opportunities are wide in the fields of hybridization and breeding; nearly every *Jasminum* whose chromosome number has been counted so far has been found to possess the same somatic number ( $2n=26$ ).

### Ligustrum

The privets are important garden plants, not so much for their flowers, which are invariably white or cream colored, usually very strongly and almost overwhelming scented with a characteristic sweet but slightly fetid fragrance, but more for their value as hedge plants or for forming a dense evergreen background. The commonest species is *Ligustrum ovalifolium* and is, perhaps, the most widely used of all hedge plants. It grows quickly and densely, takes easily from cuttings, and stands any amount of trimming with hedgecutters or shears, but it is a "greedy" plant, with numerous fibrous roots near the soil surface and other plants often do not do well when grown close to a privet hedge. In New Eng-





**PLATE V**

(Left) Flowering branch of *Jasminum multiflorum*. (Right) Small flowering plant of *Jasminum polyanthum* grown in a pot.

land this species is deciduous but in slightly milder climates it remains evergreen throughout the year. In fact the genus is generally evergreen and some of the more tender species are particularly valuable farther south because of their thick, glossy leaves. For example, *L. lucidum* and *L. japonicum*, which will stand very little frost, are best seen in such climates as those of southern California and the southeasternmost states.

The fruit of *Ligustrum* is a small, fleshy drupe or "berry". Often, as in the English privet, *L. vulgare*, it is black and lustrous and an added attraction in the autumn, but one species, *L. sempervirens*, a native of western China, is noteworthy in falling between this genus and *Syringa*. In the latter, the fruits are dry dehiscent capsules and, technically, this is the only constant difference between the two genera, but in *L. sempervirens*, the soft fruit finally dehisces by means of two valves. In the past this species has been in cultivation but whether it is still to be found in any garden or collection is doubtful. It has died out in at least one botanic garden where it was cultivated a couple of decades or so ago.

### Noronhia

This Madagascan genus is included in this account because of one of the species, *Noronhia emarginata*, which is widely, if sporadically, cultivated in tropical regions. It is met with occasionally as a garden tree in Hawaii and Florida and produces smallish but thick, waxy, yellow, fragrant flowers followed by drupes which are purple when ripe, about 1 inch long, and said to be edible. It has very thick, leathery leaves and has been recommended for planting in windswept areas where it is claimed to be resistant to damage by salt spray.

### Olea

This is perhaps the most important genus from the economic point of view, because of the best known species, *Olea europaea*, the source of olives and olive oil. It has been in cultivation in the Mediterranean region for centuries and is one of the domesticated plants with an unknown wild origin. One or two species which produce small, inedible fruits and are native in the Sahara area, Abyssinia, and Madeira, have been claimed at various times to be the progenitors. The "wild" olive of the Mediterranean is almost certainly a cultivated olive gone wild, rather than the original species from which it has been developed.

Unable to stand much frost, *Olea europaea* is adapted to a Mediterranean climate and in the U.S. grows best in parts of California where, with its somber evergreen foliage, it is of great value as a shade tree, quite apart from its importance as the source of olives.

There are perhaps 30 species in this genus, distributed throughout Africa and from southern Asia extending to eastern Australia, New Caledonia and the New Hebrides. Although an occasional species may be grown as a botanical novelty, none of them, apart from the true olive, are in general cultivation.

## Osmanthus

Closely related to the previous genus, *Osmanthus* is noted as containing evergreen shrubs with delightfully fragrant flowers. The leaves in some species, e.g. *O. heterophyllus* (*O. aquifolium* and *O. ilicifolius*), are very like those of holly but they are always borne opposite one another on the stems, not alternate as in the genus *Ilex* of the family Aquifoliaceae, the true hollies.

One species, *Osmanthus fragrans*, has been prized by the Chinese for centuries and the flowers (as with those of some species of *Jasminum*) are used for flavoring tea. The fruit is very like that of an olive and the main difference between the two genera rests in the technical character that the petals overlap in the bud in *Osmanthus* but are arranged edge to edge in the flowerbuds of *Olea*.

None of the species are hardy in New England, outside Cape Cod, but for the southeastern, southern and western states there are several species that are worth growing. They are among the best evergreens because of their glossy, deep green foliage, but in addition they bear a profusion of fragrant white, cream, or, in one case, orange blossoms. *Osmanthus heterophyllus* is a native in Japan and Formosa and has been in cultivation long enough for several forms with variegated foliage to appear: variants with white or yellow margins or streaks, and one with a dark purple coloration.

In areas where the winters are not so severe as those in New England, one of the most outstanding early spring flowering shrubs is *Osmanthus delavayi* (sometimes placed in a separate genus *Siphonosmanthus*, mainly distinguished by the possession of tubular flowers). In March or early April it covers itself with pure white, sweetly scented blossoms which, although individually not very large, are usually borne in such profusion, and contrast so strongly with the small holly-like evergreen leaves, that the plant is an asset to any garden.

The native American devilwood, *Osmanthus americanus*, which grows in the coastal plain from southernmost West Virginia to Louisiana is sometimes found in collections, but, as a garden plant, is not as valuable as the Asiatic species.

## × Osmarea

Some years ago a hybrid between *Osmanthus delavayi* and *Phillyrea decora* was produced at the nursery of Burkwood and Skipwith in England. This hybrid was named × *Osmarea burkwoodii* (the generic name being an abbreviated compound of the generic names of the parent species). It has considerable value as an evergreen shrub with white fragrant flowers borne in the spring and because it grows quickly, exhibiting hybrid vigor, is of great value in the same areas where the genus *Osmanthus* can be grown.

## Phillyrea

Another genus very close to *Olea* and *Osmanthus*, and differing from the latter in the technical characteristics of its fruit, *Phillyrea* is confined in the wild to the Mediterranean region, except for one species from the Turkish-Georgian border

area near the Black Sea. This last species, *P. decora* (*P. vilmoriniana*) is perhaps the most horticulturally valuable in the genus. It forms a low shrub with thick green leaves very reminiscent of the quite unrelated cherry-laurel, *Prunus lauro-cerasus*, of the rose family. The fruits are like small dark plums but the creamy white flowers are of no particular merit.

The flowers of the other species of this genus, however, are rather inconspicuous with greenish-white petals but the plants have great value as evergreen shrubs suitable for dryish areas with a Mediterranean climate, such as parts of southern California, most similar to their natural habitat.

### Picconia

Little need be said of this genus which contains two species, one from the Canary Islands, *Picconia excelsa*, and the other from the Azores, *P. azorica*, but the former is grown occasionally as a good evergreen shrub or small tree in warm temperate or sub-tropical gardens. These species have frequently been placed in the genus *Notelaea* which, however, is confined to Australia and differs in minor characters of the inflorescence.

### Schrebera

Similarly, this is a little grown genus, this time of sub-tropical and tropical regions, mainly from Africa, but with one Asiatic and one South American species. The leaves are characteristically trifoliate or pinnate but simple-leaved species occur and the flowers somewhat resemble those of a small jasmine, but with a colored "eye", they are said to be sweetly fragrant and are followed by large woody capsules somewhat like those of *Syringa*, but larger and much woodier.

### Syringa

The lilacs are one of the best known and best loved of all flowering shrubs and are not to be confused with the unrelated genus *Philadelphus* which is often called syringa as a "common" name. The genus is not a large one but contains about 28 species, most of them native of temperate Asia, but with two from southeast Europe. The best known species is the European *Syringa vulgaris* and several hundred cultivars with white, pink, lilac, purple or bluish flowers, single or double, have been bred and selected (and even very pale yellow flowers in cv. 'Primrose'). This development took place mainly in France in the latter half of the last century and the first decades of the present. The Arnold Arboretum is justly proud of its large collection of nearly 500 varieties and species and the New England climate seems to suit them very well.

Not everyone, however, realizes that there are other types of lilac. Some of the best of these are quite distinctive. The earliest species to flower, *Syringa pinnatifolia*, has little horticultural value with its small white flowers, but it is of botanical interest because of its relatively diminutive pinnate leaves. Following closely after this, however, is the north Chinese and Korean *Syringa oblata*, a



PLATE VI

(Upper) Inflorescence of *Syringa* × *prestoniae* 'Isabella'. (Lower) Inflorescence of *Syringa amurensis*.

species very closely related to the European *S. vulgaris*, and with similar attractive, lilac colored flowers with a sweet scent. One of the most charming and distinctive species to follow is *S. laciniata*, so-called because of its variable, divided leaves. With deep lilac flowers borne in dense masses on the straight more or less upright branching twigs it makes a fine show and never fails to invoke comment and praise. It has been suggested that it is one of the parents of the Persian lilac, the other being the very rare *Syringa afghanica*, the only species not yet known in cultivation and native in a limited area of eastern Afghanistan and western Pakistan. The Persian lilac, *S. × persica*, came into cultivation in Europe along the old trade routes from the Orient and like the so-called Chinese lilac, *S. × chinensis*, has probably been in cultivation for centuries.

The majority of the species are Asiatic and some flower a little later than the common lilac. In an attempt to extend the flowering season and produce new hardy plants, Dr. Isabella Preston of the Dominion Experimental Farm, Ottawa, crossed *Syringa reflexa* with *S. villosa* in 1920 and produced a whole new race of seedlings which came to be called the Prestoniae hybrids or *S. × prestoniae*. As well as flowering later, the flower shape of these hybrids is somewhat different from that of the common lilac. The petal tube is more slender and the color is pink or mauve but without the exact sweet fragrance of the common lilac (Plate VI, upper). Quite extensive hybridization has taken place within the genus since then and, when growing lilacs today, one is not restricted to the varieties of the common species, most beautiful and sweet-scented though they are.

The last species of lilac to flower are quite distinct from the others and at first might not be thought to belong to the genus *Syringa* at all (in fact some botanists have placed them in a separate genus, *Ligustrina*). Basically, however, they differ only in their cream-colored flowers and the length of the petal tube. This group, with *S. amurensis* and *S. pekinensis*, lies somewhat between the lilacs and the privets. The fruit is undoubtedly that of a lilac but the flowers look more like those of a privet and possess the same strong scent (Plate VI, lower).

### Summary

Some families, notably the rose family, the Rosaceae, and the heather family, the Ericaceae (and the orchids, for cultivation under glass), may have supplied a larger number of genera of important horticultural plants, but, for its size, the Oleaceae is particularly noteworthy.

As has been said the basic floral pattern of four joined petals, two stamens and an ovary of two chambers is general throughout the family but the occasional exceptions add interest. In *Chionanthus* the petals are divided nearly to the base (and in the related and large tropical genus *Linociera* these divisions actually reach the base and the petals are held in pairs by the stalk of the stamen). In other genera there are no petals at all, for example, most species of *Fraxinus* and *Forestiera*. In *Jasminum*, however, the number of petals has increased so that 7,

8, or 9 lobes are the usual number. The leaves may be simple, more or less divided to the base or completely trifoliate or pinnate, and, as has been mentioned, the fruit types exhibit considerable diversity. For perhaps the majority of species, the fruit is an olive-like drupe, although usually somewhat smaller than the cultivated olive. But there are dry dehiscent capsules in *Forsythia* and *Syringa*, to mention two, and winged samaras in *Fraxinus*, *Abeliophyllum* and *Fontanesia*. From the horticultural point of view, the members of this family are most notable as flowering shrubs which produce a profusion of yellow, white, pink or lilac flowers famed, in so many cases, for their fragrance.

P. S. GREEN

## AN EXHIBITION OF PHOTOGRAPHS OF BONSAI AVAILABLE ON LOAN

The Larz Anderson collection of Japanese dwarf trees was presented to the Arnold Arboretum as a memorial to his friend, Charles Sprague Sargent, the first Director of the Arboretum (see *Arnoldia* 24: 101-104, 1964). This collection of twenty-seven specimens, ranging in age from fifty-six to two hundred and twenty-six years and in height from one to four feet, is on seasonal exhibition out-of-doors in a special lath shelter adjacent to the Dana Greenhouses of the Arboretum. During the winter, the collection resides in a temperature-controlled house in reduced light. In the past, selected specimens have been forced into flower, leaf or spring condition for the early, major horticultural shows and transported to Boston, Detroit, New York and Washington. Although this has enabled many people to see this outstanding collection, it has also had its effect on the specimens themselves, and caused concern among the staff responsible for their care. To protect the Bonsai, yet enable enthusiasts to enjoy these magnificent examples, Mr. Heman Howard has photographed the collection, and a selection of mounted prints is now available on loan.

A total of twenty-six prints, each eleven by fourteen inches, is mounted on standard mounting board with an overall dimension of sixteen by twenty inches. All prints have tabs on the back and can be hung on walls or wire, and each is sturdy enough for self-support on an easel. On the front of each print is lettered the botanical name, the common name and the age of the plant. On the back is additional data on the dimensions of the specimen. Prints of Bonsai of *Acer*, *Chamaecyparis*, *Cryptomeria*, *Pinus* and *Prunus* species are included. The special housing given the plants in summer and winter at the Arnold Arboretum is pictured. Four prints show the Bonsai on exhibition at flower shows in Boston and Detroit.

The collection of photographs will be loaned at a fee of ten dollars for an exhibition period of one week. The prints are mailed in a custom-built and padded shipping case. Mailing should be by parcel post, insured for two hundred dollars. Requests for the loan of this collection should be directed to the Horticultural Secretary, Arnold Arboretum, Jamaica Plain, Massachusetts 02130.



# ARNOLDIA



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## THE MOCK-ORANGES

THERE are about fifty species and varieties of *Philadelphus* being grown in the commercial nurseries of the United States, so there is a wealth of material from which to select ornamental plants. The collection at the Arnold Arboretum contains over one hundred species and varieties. They all have white flowers, their fruits are dried capsules and not very interesting, and the autumn color is not especially outstanding, being yellow or yellowish. In other words, they are chiefly of value during the short period when they are in bloom; but they are all grown easily in almost any normal soil, and are mostly free from injurious insect and disease pests—reason enough why they have proved popular over the years.

Some plants in this group have special merit. *Philadelphus coronarius*, for instance, is excellent for planting in dry soil situations. Many of the hybrids have extremely fragrant flowers, and some of the plants, like *P. laxus* and *P. × splendens*, have branches which face the ground well all around and make fairly good foliage specimens throughout the length of time they retain their leaves.

On the other hand, the flowers of many of the species are not fragrant, and some plants, like *Philadelphus delavayi* and *P. × monstrosus* reach heights of fifteen feet or more; they are frequently just too tall and vigorous for the small garden. There are better shrubs of this height with interesting flowers, better autumn color, and fruits in the fall (like some of the viburnums), so, if tall shrubs are desired, it is not the mock-oranges which should have first consideration.

### Hybrids

It is particularly noteworthy how many of the hybrid mock-oranges originated in the nurseries of Lemoine and Son in Nancy, France. Victor Lemoine, born in 1823, worked in several places while a young man, one of them being the famous estate of Louis Van Houtte in Ghent, Belgium. In 1850, he established his own nursery at Nancy, and entered into a long period of plant hybridization. He,

[ 29 ]



and his successors in later years, originated many of the best deutzias, weigelas, mock-oranges, lilacs, and other groups of plants, herbaceous as well as woody. Of the twenty-one hybrid mock-oranges in the following list, seventeen were originated and introduced by the Lemoines, all between 1894 and 1927.

Because good clones are available, it is probably not advisable to grow *Philadelphus*  $\times$  *cymosus*, *P.*  $\times$  *lemoinei* and *P.*  $\times$  *virginalis* as such, for many plants of these hybrids, especially if grown from seed, are inferior to the named clones which should be grown instead.

The first major cross the Lemoines made was in 1884, using *Philadelphus coronarius* and *P. microphyllus* as the parents. The progeny was named *P.*  $\times$  *lemoinei* and some of the resultant clones have proved better ornamentals than either parent. Another hybrid, made in 1903, was *P.*  $\times$  *lemoinei* crossed with the tall growing and large flowered *P. grandiflorus*. The resulting clones were grouped under the name *P.*  $\times$  *cymosus* but, as a rule, most of them are more tender than many of the others. The third cross, which resulted in more double flowered varieties than the other two, was one in which *Philadelphus*  $\times$  *lemoinei* and probably *P.*  $\times$  *nivalis* 'Plenus' were used. The latter is itself a hybrid between *P. pubescens* and *P. coronarius*, so that, as might have been expected when these two were crossed, many interesting segregates resulted. The resulting offspring were grouped under the name *P.*  $\times$  *virginalis* and include larger flowered and more vigorous clones than most of those resulting from the other crosses.

As a group, mock-oranges start to bloom by the end of May with *Philadelphus schrenkii jackii*, which is first. The majority flower during the first three weeks of June, with the peak of bloom about the middle of the month. The last species, *P. incanus*, blooms in the Arnold Arboretum about the last week of June. Some of the newer cultivars like 'Frosty Morn' and 'Minnesota Snowflake' are reported to be hardy to  $-30^{\circ}$  F. (Zone 3), *P. coronarius* and *P. laxus* and 'Mont Blanc' are hardy in Zone 4 and the rest are hardy in Zone 5. There are, of course, other mock-oranges suitable for warmer areas, but of the hardier species and varieties, these are the best ornamentals.

### Habit

These shrubs vary considerably in habit and range in height from 4 to 12 feet. 'Avalanche', for instance, has pleasingly arching branches and is only 4 feet tall. 'Erectus', about the same height, is rigidly upright, which might be desirable in some locations. Others, like *Philadelphus inodorus*, *P. laxus*, *P.*  $\times$  *splendens* and 'Mont Blanc', are definitely mound-like, making them ideal specimens in many situations.

On the other hand, the habit of several of the *Philadelphus*  $\times$  *virginalis* clones (especially 'Virginal') is not pleasing; they are ruggedly upright and produce few lateral branches at the base. It is usually advisable to use such plants in the rear of the shrub border, with smaller plants in the foreground to hide this somewhat unsightly trait.

## Flowers

Fragrance is an important factor, for this is one of the reasons these plants have proved so popular over the years. Some, like *Philadelphus inodorus* and *P. × splendens* are practically scentless. The native *P. microphyllus*, not included in the following list because of its lack of hardiness, is one of the most fragrant, and the reason why the *P. × lemoinei* clones (of which it is one parent) are generally so sweetly scented. 'Avalanche', 'Conquête', 'Cole's Glorious', 'Frosty Morn', 'Innocence', and 'Virginal' are among the most fragrant. *P. coronarius* should also be included here, but, unfortunately, it has too frequently been grown from seed collected from miscellaneous mixed plantings, so that many inferior strains are listed at present. The true, old-fashioned *P. coronarius* is extremely fragrant.

The double flowered varieties, of course, retain their petals longer than those with single flowers, and so are valued. 'Albâtre', 'Argentine', 'Boule d'Argent', 'Frosty Morn', 'Girandole', 'Glacier', 'Minnesota Snowflake' and 'Virginal' are the best of these. Some, however, are highly variable and when grown under some circumstances may produce many single flowers. Because of variations due to growth conditions, it is difficult to select one variety as the best of this group. The plant that is grown well, with the best soil, light, and water conditions, is usually the one with the best double flowers.

Of the twenty-nine mock-oranges in the following list, nineteen have single flowers, but these vary considerably in size. Some, like 'Avalanche' and 'Bouquet Blanc' have flowers which are only one inch across while those on others, like 'Bannière' and 'Belle Etoile', may be as large as  $2\frac{1}{4}$  inches in diameter, especially if they are grown under optimum conditions.

For northern gardeners the following twenty-nine selections are the best of the hundred grown in the Arnold Arboretum.

### The Better Species and Hybrids

**P. coronarius**      9 ft. high      Zone 4      Southern Europe      Sweet Mock-orange

Single flowers,  $1\frac{1}{2}$ " in diameter, and very fragrant. It is this species which has been the most popular in the past but unfortunately it has been so frequently reproduced by seed that in nurseries it is now badly adulterated by inferior types. The true plant should have very fragrant flowers and it should grow well in dry situations.

**P. incanus**      9 ft. high      Zone 5      China      Gray Mock-orange

Single flowers,  $1\frac{3}{4}$ " in diameter, with only a slight fragrance. It is one of the last of all mock-oranges to come into bloom, usually in late June, and is recommended here chiefly because it extends the flowering season.

**P. inodorus** 9 ft. high Zone 5 Southeastern U.S. Scentless Mock-orange

Single flowers, 2'' in diameter, and only slightly fragrant. It is the only mock-orange with glossy green leaves, making a fine ornamental specimen.

**P. laxus** 6 ft. high Zone 4 Georgia Drooping Mock-orange

Single flowers, 1½'' in diameter, with only slight fragrance. Blooming in early June, this is one species with branches facing the ground on all sides, making a good foliage specimen.

**P. purpurascens** 12 ft. high Zone 5 China Purple-cup Mock-orange

Single flowers, 1½'' in diameter; each flower with a purple calyx, and very fragrant.

**P. schrenkii jackii** 8 ft. high Zone 5 Korea Jack Mock-orange

Single flowers, 1'' in diameter, flowering in late May; the first of all the mock-oranges to bloom. It is because of its early flowers that this mock-orange is recommended.

**P. × splendens** 8 ft. high Zone 5 (possibly *P. grandiflorus*  
× *gordonianas*)

Single flowers, 1½'' in diameter, fragrant, and with bright yellow stamens. Plants are well branched on all sides and make good foliage specimens.

### Horticultural Varieties

**'Albatre'** (*P. × virginalis*) 5 ft. high Zone 5 Introduced by Lemoine in 1914

Double flowers, 1¼'' in diameter, slightly fragrant, and of good habit (Plate VII, upper).

**'Argentine'** (*P. × virginalis*) 4 ft. high Zone 5 Introduced by Lemoine in  
1914

Double flowers, 2'' in diameter, sometimes with as many as 32 petals. The flowers are very fragrant.

**'Aureus'** (*P. coronarius*) 5 ft. high Zone 4

The foliage first appears colored a bright yellow early in the spring, later turning to almost normal green by mid-summer. It originated before 1878.

**'Avalanche'** (*P. × lemoinei*) 4 ft. high Zone 5 Introduced by Lemoine in  
1896

Single flowers 1'' in diameter, and one of the most fragrant of all the mock-oranges. It has a pleasing, arching habit (Plate VII, lower).



**PLATE VII**

(Upper) *Philadelphus* 'Albâtre', habit.

(Lower) *Philadelphus* 'Avalanche', habit.

**'Banniere'** (*P. × cymosus*) 7 ft. high Zone 5 Introduced by Lemoine in 1907

Semi-double flowers,  $1\frac{1}{2}$ – $2\frac{1}{4}$ " in diameter, and fragrant. The bush is rather straggly, but this is the first of these hybrids to bloom.

**'Belle Etoile'** (*P. × lemoinei*) 6 ft. high Zones 5–6 Introduced by Lemoine  
in 1925

Single flowers,  $2\frac{1}{4}$ " in diameter, fragrant and with an arching habit.

**'Boule d'Argent'** (*P. × lemoinei*) 5 ft. high Zone 5 Introduced by Lemoine  
in 1894

Double flowers, 2" in diameter, and slightly fragrant; an excellent variety.

**'Bouquet Blanc'** (*P. × virginalis*) 6 ft. high Zone 5 Introduced by Lemoine  
in 1903

Single to slightly double flowers, 1" in diameter, but well distributed over the entire plant. In shape it is well rounded (Plate VIII, upper).

**'Burford'** (*P. × virginalis*) 9 ft. high Zone 5 Originated in England in 1921

Single to semi-double flowers,  $2\frac{1}{4}$ "– $2\frac{1}{2}$ " in diameter.

**'Cole's Glorious'** (*P. × virginalis* × 'Rosace') 6 ft. high Zone 5

Introduced by Cole Nursery Co., Painesville, Ohio in 1940, this has single flowers, 2" in diameter, and very fragrant.

**'Conquete'** (*P. × cymosus*) 6 ft. high Zone 5 Introduced by Lemoine in  
1903

Flowers single, 2" in diameter; one of the very best and most fragrant of all the mock-oranges.

**'Erectus'** (*P. × lemoinei*) 4 ft. high Zone 5 Introduced by Lemoine in 1894

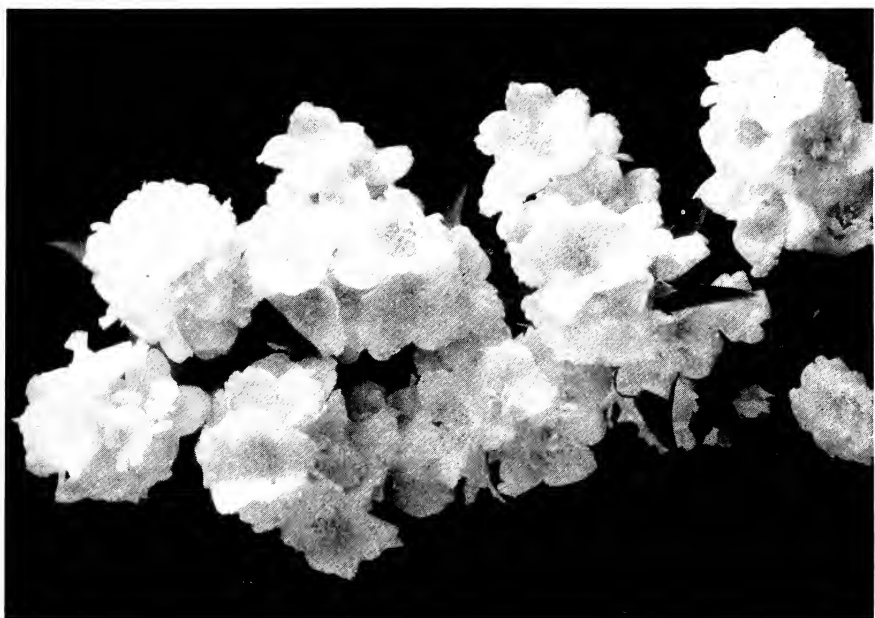
Flowers single,  $1\frac{1}{4}$ " in diameter, and very fragrant. This has not grown too well in the Arnold Arboretum, but the habit is definitely erect, and in areas where it is hardy it should prove an interesting plant.

**'Fleur de Neige'** (*P. × lemoinei*) 4 ft. high Zone 5 Introduced by Lemoine  
in 1916

Flowers single,  $1\frac{1}{2}$ " in diameter, and very fragrant.

**'Frosty Morn'** 4 ft. high Zone 3

Originated by Guy D. Bush, Minneapolis, Minn., and patented (#1174) March 10, 1953, it has very fragrant, double flowers, and has been noted as withstanding the "coldest Minnesota winters without damage from freezing back". An excellent mock-orange for cold areas.



**PLATE VIII**

(Upper) *Philadelphus* 'Bouquet Blanc', flowering branch.

(Lower) *Philadelphus* 'Glacier', flowering branch.

**'Girandole'** (*P. × lemoinei*) 4 ft. high Zone 5 Introduced by Lemoine in 1916

Flowers double,  $1\frac{1}{4}$ " in diameter, and fragrant.

**'Glacier'** (*P. × virginalis*) 5 ft. high Zone 5 Introduced by Lemoine in 1914

Flowers double,  $1\frac{1}{4}$ " in diameter, and fragrant.

**'Innocence'** (*P. × lemoinei*) 8 ft. high Zone 5 Introduced by Lemoine in 1927

Flowers single,  $1\frac{3}{4}$ " in diameter, and with 8–10 in a cluster. It is one of the most fragrant of all the mock-oranges.

**'Minnesota Snowflake'** (*P. × virginalis*) 6 ft. high Zone 3

Introduced by Guy D. Bush, Minneapolis, Minnesota in 1935, and patented (#538) August 11, 1942. It is said to be hardy to  $-30^{\circ}$  F. Flowers double,  $1\frac{1}{2}$ " in diameter, with 3–7 flowers in each cluster and fragrant. Clothed with branches well to the ground, it makes an excellent specimen for northern gardens.

**'Mont Blanc'** (*P. × lemoinei*) 4 ft. high Zone 4 Introduced by Lemoine in 1896

Flowers single,  $1\frac{1}{4}$ " in diameter, and very fragrant. It is one of the hardier varieties.

**'Norma'** (*P. × cymosus*) 6 ft. high Zone 5 Introduced by Lemoine in 1914

Flowers single,  $1\frac{3}{4}$ " in diameter and fragrant.

**'Perle Blanche'** (*P. × cymosus*) 6 ft. high Zone 5 Introduced by Lemoine in 1900

Flowers single,  $1\frac{1}{2}$ " in diameter, and one of the most fragrant.

**'Virginal'** (*P. × virginalis*) 9 ft. high Zone 5 Introduced by Lemoine in 1907

Flowers double, 2" in diameter, and very fragrant. The one drawback of this variety is that older plants tend to produce few leaves and branches near the base.

DONALD WYMAN



# ARNOLDIA



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## THE HERBARIUM INTRODUCED

**E**VEN Arnoldia readers must realize that many people have never heard the word "herbarium," that fewer still know its meaning, and that even fewer have ever been inside a herbarium building. In fact, an astonishing number of well-meaning but misguided garden lovers harken back to high school Latin and imagine "herbarium" to be another word for a place to pick rosemary, mint leaves or medicinal herbs. A quick look at Webster's dictionary must give them embarrassing second thoughts, and set them to wondering about "a collection of dried plants, usually mounted and classified." Beyond this, of course, is the important fact that the herbarium is a key reference tool of the botanist and plant grower.

Since the beginning of recorded time, and probably long before that, men have been preoccupied with arranging their knowledge of natural phenomena in a systematic order. This constant effort for order goes beyond men's innate appreciation of things rational; more pragmatic is the realization that nature is rendered more useful through scientific study, comprehension and classification. More known quantities can be made more readily available to more people for more purposes. Any discussion of flora—be it professional or amateur—necessarily involves the scientifically given names of plants; and it follows logically that the herbarium is thus essential to all aspects of plant study, whether it is care, growing, propagation, ecology, geographical distribution, or whatever. For, after all, one must know what the plant is!

The herbarium of the Arnold Arboretum is divided into two sections: the cultivated material, numbering more than 100,000 specimens, is located in Jamaica Plain for immediate accessibility to the collections of living material in the Arboretum itself. This horticultural division contains voucher specimens not only of the plants cultivated in the Arboretum but also of plants grown in arboreta, botanical gardens, city parks and back yards in the United States and throughout the world. The non-cultivated, or wild material, numbering 700,000 specimens

or more, is housed in the Harvard University Herbarium Building in Cambridge, combined with the herbaceous collections of the Gray Herbarium, in easy reach of Harvard's botany students and botanically interested faculty members whose studies are more apt to deal with wild plants than with cultivated. Although this separation is made for the sake of convenience, the two sections are frequently used together, as when comparing a cultivated species with its wild progenitors, or in gathering complete information about a plant.

When it is collected, the plant specimen is dried in a press. This ensures that it is flattened and so occupies less space in subsequent storage, and that the leaves, in particular, neither curl up nor wrinkle but retain their original outline and almost their natural size. When dried, these specimens are mounted by fastening them with a special plastic glue on heavy stock herbarium paper; an accompanying label is also attached on the sheet. This label should give all the pertinent data observed by the collector: date of collection, location, habit, appearance of the inflorescence and/or fruit if present, fragrance, etc., and, in the case of cultivated material, the source of the plant. The amount and value of this information depends, of course, on the plant itself as well as on the experience and abilities of the collector, and the number of observations he has been able to make of the plant. The identity of the specimen is then checked and, if it came from the Arboretum, this also constitutes a check on the identity of the living plant on the grounds, a matter which is particularly important in the case of new accessions. Where necessary the mounted specimen is annotated with its identity and then filed in its proper nook in the herbarium cases—determined at the Arnold Arboretum by its family, genus, species, and finally geographic origin. Once in the case, this named specimen is available to other experts who may be able to add data to that already given, or to interested people who may want to identify or inform themselves about a particular plant or group of plants. Furthermore, as long as the specimen is kept dry and free from injurious insects (the kind that eat stored food and other products), it will last for centuries, as have thousands of specimens already in the older herbaria.

If, while visiting a garden, you were to admire an unfamiliar plant and consider adding it to your own garden, you would, naturally, want to know something more about it. Since gardening books, even at their best, are, needfully, selected lists with selected information, it would be well worth the trouble to gather a small specimen of leaves, flowers and/or fruit, and have the identification checked in a herbarium, for the scientific name of the plant is most important. A rose by any other name is likely to smell quite different! but proper scientific identification gives confidence of acquiring an identical plant from a nursery.

A horticulturally or botanically informed person is usually able to place a plant in its proper family almost immediately; he may also know the generic identity offhand, but unless the plant is commonly well known or belongs to a genus of which he has made thorough study, further refinement of the name must usually

be completed through a check of herbarium specimens, for no matter how completely a plant is described or illustrated there is no substitute for an actual specimen.

Where garden plants are involved, it may be difficult to supply precise nomenclature due to the large number of hybrids and cultivars that are developed by amateur or professional breeders who sometimes fail to register new cultivar names—or who are ignorant of those already registered, and duplicate them—thus ensuring a certain amount of confusion. The lilac collection of the Arnold Arboretum is elaborate testimony to the range of variation which can be developed from a single species (in this case, *Syringa vulgaris*, from which over 300 different cultivars have been derived), and were these names not registered, voucher specimens of many conserved in the herbarium, for example, and Kodachrome slides available to show color, lilac lovers would have far more difficulty than they do now in obtaining desired lilac plants for their gardens.

If the expert is able to match your specimen against one in the herbarium, which is already accurately named, he can then refer to the library where a monographer may already have saved him the effort of shuffling through more sheets and making detailed, time-consuming observations; and, with luck, one of the horticultural books will list your plant and offer experienced advice on raising it. Besides the pleasure of learning about the plant, you will be able to ask a nurseryman for it by its proper name instead of trying the 'well-it-had-pretty-little-yellow-flowers' technique.

At the Arboretum, herbarium specimens are made from the plantings on the grounds both at Jamaica Plain and Weston. It is the aim that the new accessions be gathered as soon as they are ample enough to yield adequate specimens, and the staff makes collections at all significant stages of development; especially foliage, flowers and fruit; notes and photographs are also taken to record color and form. In the case of hybrids or cultivars raised at the Arboretum, specimens of the original parents are made, if possible, with a view to providing complete records to aid propagators, nurserymen and taxonomists. In addition, duplicate material is gathered and sent on an exchange basis to other institutions for their herbaria.

This exchange is important too, for by its means material which has passed through the hands of experts in particular groups and who may be working at an arboretum or botanic garden in another country, are added to the herbarium with the experts' opinions and annotations attached. Or sets of material of a particular genus may be received from a garden which grows an especially complete, authoritative and specialized collection of those plants. Occasionally, too, a difference in usage of a botanical name from one country to another comes to light. This difference can then be investigated and corrected, for, after all, Latin is used for scientific names so that they can be truly international in character. To this same end, the naming of plants is carefully governed by the International Code of

Botanical Nomenclature and its counterpart for cultivated plants which are fully international, even in these days of international hostility and competition.

The use of the herbarium in ascertaining the identity of a plant for horticultural purposes, or to satisfy curiosity, is familiar to many home gardeners (although, judging from some of the leaf fragments we occasionally find enclosed in letters, there are numerous people who expect the botanist or horticulturist to name a plant off the top of his head even when given unsubstantial material). Behind the scenes, however, the taxonomists are working with anatomists, cytologists, ecologists, paleobotanists, nurserymen, propagators, as well as with scientists in other fields. Drug companies extracting chemicals from plants want to know the name of a certain specimen and where it grows; hospitals and mothers call describing a berry eaten by a small child, and asking if it is toxic; the Federal Government's Atomic Energy Commission is conducting experiments testing the reaction of different plants to radiation; Dr. Richard A. Howard, Director of the Arboretum, has developed and cooperated in "survival" programs aimed at keeping soldiers alive in uncivilized areas by teaching them to live off the local vegetation—and not eat the poisonous plants in error; city planners need street trees that will thrive within specified limits; entymologists seek the identification of plants visited by particular insect species. For these problems, and many more, the internationally accepted nomenclature of a plant is a necessary ingredient of the study.

The herbarium, obscured by the showy display of the ground plantings, the greenhouse area, and the bonsai, plays an important, if undercover, role in scientific and horticultural routine of the Arnold Arboretum although it is usually the least appreciated unit. But if botanical and horticultural study is to progress, it must do so with the aid of a well-organized herbarium. To this end, the Arboretum is making a concentrated effort to increase the scope and number of its collections, soliciting cultivated material from all parts of the world, and adding material from its own new accessions.

STEPHANNE B. SUTTON

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See also: Kobuski, Clarence E., "The Horticultural Herbarium," *Arnoldia*, 18: 25-18, June, 1958.

# ARNOLDIA



## A continuation of the BULLETIN OF POPULAR INFORMATION of the Arnold Arboretum, Harvard University

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### A HOME ARBORETUM

WHEN one notices on a map of the climatic zones of the United States\* that the island of Martha's Vineyard, off the coast of Cape Cod, is regarded as Zone 7 one should not be surprised, perhaps, that the trees, seen on a recent visit to the small private arboretum of Stanley R. Leaming, should be thriving so well. On the mainland, Zone 7 touches the northern part of South Carolina, and it is possible that the little mid-island valley in which the plants are growing is climatically like the even more favorable Zone 8. Yet it is not the condition or variety of trees which impresses one, as much as what can be done by an enthusiastic amateur in establishing a miniature arboretum in such a place.

Miniature is the right adjective, too, for the area is possibly three acres in extent and with its dense, almost jungle-like planting, lies in Middle Road on the Island. But here are grown many trees uncommon in the north and choice in any place. Mr. Stanley R. Leaming is, by profession, a piano-tuner and for nearly fifty years has travelled back and forth dealing with island-dampened pianos, in the summer on Martha's Vineyard and Nantucket in the north and, during the winter, in South Carolina in the south. And always there have been trees and islands, for in the south his home is on Edisto Island, where, in a plantation-like setting, he has another much larger arboretum that grows plants of the warmer Zone 9: plants like camellias, the less hardy magnolias and even species of *Citrus*.

As will be seen from the photographs in Plate IX, taken during the summer of 1965 in his northern arboretum, the trees became unexpectedly crowded as they grew. Mr. Leaming has said that he wishes he had realized that the young plants would grow so big when they were put in thirty-five years ago. Spacing is always of primary importance and it is hard, even for an expert, to imagine a little seedling grown into a forest giant. It is difficult to estimate just how large

\* Plant Hardiness Zone Map, U.S. Dept. Agric. Misc. Publ. 814. 1960.



the planting distances were that Mr. Leaming used, but one might guess they were about 20 feet.

In any case it is a thrill to pass so quickly from the prosaic growth of scrub-oak and pine by the island road into a setting where a 30-foot *Taxodium distichum* flourishes next to several clumps of bamboo. Nearby, too, is a huge tropical-looking *Kalopanax pictus* and one looks up to see a crowded 40-foot specimen of *Metasequoia glyptostroboides* reaching up to find the sun.

As in any attempt to grow rare plants together in such a setting, there have been failures, and the remains of some are still in place, feebly trying to struggle against the climate and surroundings. I will not attempt to list them, but three in particular come to mind: *Cephalotaxus harringtonia* var. *drupacea*, *Juniperus communis* cv. 'Suecica' and *Pinus aristata*.

Among the evergreens there are some fine specimens, for example: *Abies procera* f. *glauca* (*Abies nobilis* f. *glauca*, planted about 1933 and now around 55 ft. high and 24 ins. in diameter at 4 ft.), *Chamaecyparis lawsoniana* (a fine example about 40 ft. high), *Cryptomeria japonica* cv. 'Lobbii' (about 40 ft. high, Plate IX) and *Cupressus arizonica* (a Zone 7 plant, estimated to be 20 ft. in height). Other conifers worthy of note, some better than others, but all mature, are: *Abies homolepis*, *A. nordmanniana*, *A. sachalinensis*, *Cunninghamia lanceolata* (Zone 7, Plate IX), *Libocedrus decurrens*, *Picea sitchensis*, *Pinus parviflora* f. *glauca*, and *Thuja occidentalis* cv. 'Ellwangeriana' (a fine specimen about 12 ft. high).

But it is not only evergreens that fill this minuscule arboretum, for there are a number of notable deciduous trees as well. Amongst them the following are worthy of mention:

*Cudrania tricuspidata*, a Zone 7 plant in the same family as the mulberry and said to be suitable food for silk worms.

*Erodia hupehensis*.

*Liquidambar formosana*, the East Asian relative of the sweet-gum, possibly hardy for Zone 7, and a good specimen, doing well in this location.

*Maackia amurensis*.

*Paulownia*, species unknown, but about 40 ft. high.

*Phellodendron* species, about 40 ft. high. The two different trees named by Mr. Leaming as *P. amurense* (Plate IX) and *P. chinense*.

*Populus* × *canadensis* cv. 'Aurea' (*P.* 'Van Geertii', the name used by Mr. Leaming).

*Pterocarya* × *rehderiana* (*P. fraxinifolia* × *stenoptera*), estimated to have a height and spread of 50 ft., this tree was given to Mr. Leaming in 1929 as a 3-inch seedling by Mr. Rehder with whom he was well acquainted and who, it seems, was one of the motive powers behind this arboretum venture.

*Quercus myrsinaefolia* (growing under the name *Q. acuta*), this Japanese oak has formed a delightful small tree, or large shrub, 10-12 ft. high (Plate IX).

*Salix japonica*?, about 6 ft. high and shrub-like.



# PLATE IX

(Top left) *Cryptomeria japonica* cv. 'Lobbii'. (Top right) *Cunninghamia lanceolata*.  
(Bottom left) *Phellodendron amurense*. (Bottom right) *Quercus myrsinaefolia*.

*Sorbus* × *thuringiaca* (*S. quercifolia*), a fine specimen of the oak-leaved mountain ash, a plant which should be better known.

The distinction between what is a tree and a shrub is often a difficult thing, even for a plantsman, for, as above, some trees may be like large shrubs and some shrubs, when fully grown, may be tree-like in proportions. But the following selection of outstanding specimens may be roughly classified as shrubs, including several clumps of bamboo with the genus and species unknown:

*Cornus kousa*, a very large specimen which, in a shaded spot, with its "feet" almost in water, blooms continuously from June to September.

*Davidia involucrata*, only 5 ft. high after 20 years and not yet blossomed.

*Eucommia ulmoides*.

*Halesia monticola*.

*Populus alba* cv. 'Nivea', almost 10 ft. high with foliage which is "whiter-than-white."

*Prunus serrulata*.

*Rhus chinensis*.

It is understood that these grounds are to be sold and one can only hope that if this happens they will fall into the hands of a person who is, like the present owner, a lover of trees.

NELSON COON

NOTE: The author wishes to acknowledge assistance given in preparing this paper, by Mrs. Julian Hill of North Tisbury. Mrs. Hill, a vice-president of the American Horticultural Society, has an extensive and growing arboretum on Martha's Vineyard, described in the July 1964 issue of the *American Horticultural Magazine*.



# ARNOLDIA



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## PLANTS FOR SCREENING JUNKYARDS, GRAVEL PITS AND DUMPS

"MAKE America Beautiful" is a phrase which, fortunately, is being given much attention now. Three million dollars have just been appropriated by Congress for control of outdoor advertising and a like amount has been appropriated for "controlling junkyards along the highways." This is the very thing for which many a civic-minded group has been fighting during the past decade. It would not be amiss to take a hard look at some of our town dumps, and state-owned gravel pits also, with the idea of planting trees and shrubs to screen them from public view.

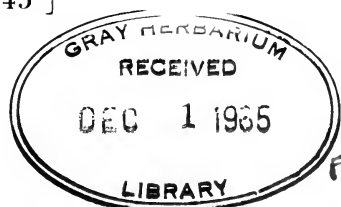
Public-spirited groups could well be active in planting, for it would add materially to the appearance of the countryside, especially as viewed by the passing motorist. Along the major highways around Boston's perimeter, several dumps, which are conspicuously unshielded, come to mind. This is a condition too often repeated in many communities throughout the country.

The sites of these depositories have undoubtedly been selected because the land is poor or unwanted. Also, it is impractical to expect that, if a highly ornamental planting were made in such places, it would be maintained. The realistic approach is to admit that these areas are necessary, that they cannot be moved at this point, and that no individual or group will give the time or money to mow lawns, or care for extensive flower beds and ornate plantings, year in and year out.

However, there might be those interested enough to make an initial planting of rugged, fast-growing trees and shrubs; that is, plants which, once established, have a good record for taking care of themselves without much additional attention. True, such plants might not be the best ornamentals available, but the chances are that the soil would not be the best either. This bulletin is being written with the hope that some action by some group, somewhere, may be taken in hiding these places from public view with plantings of comparatively inexpensive screens of "low maintenance" trees and shrubs.

These plants, should be given the best possible attention at planting time, with good soil, water and mulching. It is particularly necessary that the plants

[ 45 ]



be checked and watered carefully during the first two years of the planting, even periodically, where needed. *Arrangements and funds for doing this should be the responsibility of the planning organization and funds should be provided for this at the start of the project.* Many a good, well-conceived planting has failed because this was not done *at the start.*

Of the plants suggested in the following lists, the fastest growing trees are the poplars, willows, elms and the Douglas-fir, in that order. Of the shrubs, the fastest growing are the Forsythia, Japanese Tree Lilac, Sweet Mock-orange and Japanese Rose. In addition, and probably the fastest growing of all the shrubs suggested here for making a quick screen is the new *Rhamnus frangula* 'Columnaris', the Tallhedge Buckthorn. Using plants 2-3 feet high, a 12-foot hedge can result in five years in good soil. Plants should be placed 3-4 feet apart to make a solid screen. They bear berries (red, turning black) throughout the summer and are most attractive to birds. The ability of this plant to grow well and fast, its freedom from serious pests, its narrow and very dense habit (not much over 4 feet wide), its glossy foliage, and the ease with which it is transplanted, all combine to make it an ideal, quick-growing screen, well suited to shield dumps and gravel pits from the public view.

### SCREENING TREES FOR DRY, SANDY SOILS

\* = Evergreen    E = Easy to move    B = Must be moved carefully with a ball of soil

		Hardiness		
		Ht.	Zone	
Acer negundo	Box-Elder	60'	2	E
Ailanthus altissima	Tree of Heaven	60'	4	E
Betula populifolia	Gray Birch	30'	3-4	B
Fraxinus pennsylvanica lanceolata	Green Ash	60'	2	E
Maclura pomifera	Osage-orange	60'	5	
*Pinus banksiana	Jack Pine	75'	2	B
Populus alba	White Poplar	90'	3	E
Sassafras albidum	Sassafras	60'	4	B
Sophora japonica	Japanese Pagoda Tree	75'	4	
Ulmus pumila	Siberian Elm	75'	4	E

### SCREENING SHRUBS FOR DRY AND SANDY SOILS

		Hardiness		
		Ht.	Zone	
Acer ginnala	Amur Maple	20'	2	
Berberis thunbergii	Japanese Barberry	7'	4	E
Caragana arborescens	Siberian Pea-tree	18'	2	E
Comptonia peregrina	Sweet Fern	4'	2	B
Elaeagnus angustifolia	Russian Olive	20'	2	B
Hamamelis virginiana	Common Witch-hazel	15'	4	E
*Juniperus communis	Common Juniper	3-30'	2	B
*Juniperus virginiana	Red-cedar	10-90'	2	B
Kolkwitzia amabilis	Beauty-bush	10'	4	E
Ligustrum amurense	Amur Privet	15'	3	E
Lycium halimifolium	Common Matrimony-vine	5'	4	E
Myrica pensylvanica	Bayberry	9'	2	B
Physocarpus opulifolius	Eastern Ninebark	9'	2	E



#### PLATE X

Ornamental planting of lilacs and spruce around the Town Dump, Reading, Mass., awarded a Garden Certificate (1959) by the Massachusetts Horticultural Society. The chain link fence not only keeps unwelcome visitors out but aids in preventing paper from being blown out of the dump area. (Photograph, Paul E. Generaux)

## Screening Shrubs (cont.)

<b>Prunus maritima</b>	Beach Plum	6'	3	B
<b>Rhamnus frangula</b>	Alder Buckthorn	18'	2	E
<b>Rhus aromatica</b>	Fragrant Sumac	3'	3	
<b>Rhus copallina</b>	Shining Sumac	30'	4	B
<b>Rhus glabra</b>	Smooth Sumac	9-15'	2	B
<b>Rhus typhina</b>	Staghorn Sumac	30'	3	B
<b>Rosa rugosa</b>	Rugosa Rose	6'	2	E
<b>Viburnum lentago</b>	Nannyberry	30'	2	

## SCREENING TREES FOR NORMAL SOILS

		<i>Hardiness</i>		
		<i>Ht.</i>	<i>Zone</i>	
<b>Acer platanoides</b>	Norway Maple	90'	3	E
<b>Catalpa speciosa</b>	Northern Catalpa	90'	4	E
<b>Cercidiphyllum japonicum</b>	Katsura Tree	60-100'	4	
* <b>Juniperus chinensis</b>	Chinese Juniper	60'	4	B
<b>Morus alba</b>	White Mulberry	45'	4	
* <b>Picea abies</b>	Norway Spruce	150'	2	B
* <b>Picea pungens</b>	Colorado Spruce	100'	2	B
* <b>Pinus resinosa</b>	Red Pine	75'	2	B
* <b>Pinus strobus</b>	Eastern White Pine	100-150'	3	B
<b>Populus nigra 'Italica'</b>	Lombardy Poplar	90'	2	E
* <b>Pseudotsuga menziesii</b>	Douglas-fir	100-300'	4-6	B
<b>Quercus borealis</b>	Red Oak	75'	4	
<b>Quercus palustris</b>	Pin Oak	75'	4	
<b>Salix alba 'Tristis'</b>	Golden Weeping Willow	75'	2	E
<b>Salix babylonica</b>	Babylon Weeping Willow	30'	6	E
<b>Salix × blanda</b>	Wisconsin or Niobe Weeping Willow	40'	4	E
<b>Salix × elegantissima</b>	Thurlow Weeping Willow	40'	4	E
* <b>Thuja occidentalis</b>	American Arbor-vitae	60'	2	B
<b>Tilia cordata</b>	Little-leaf Linden	90'	3	
* <b>Tsuga canadensis</b>	Canada Hemlock	90'	3	B
<b>Ulmus parvifolia</b>	Chinese Elm	50'	5	
<b>Viburnum prunifolium</b>	Blackhaw	15'	3	B
<b>Viburnum sieboldii</b>	Siebold Viburnum	30'	4	B

## SCREENING SHRUBS FOR NORMAL SOILS

		<i>Hardiness</i>		
		<i>Ht.</i>	<i>Zone</i>	
<b>Cornus mas</b>	Cornelian Cherry	24'	4	E
<b>Forsythia × intermedia</b>	Border Forsythia	9'	5	E
<b>Lonicera maackii podocarpa</b>	Amur Honeysuckle var.	15'	4	E
<b>Philadelphus coronarius</b>	Sweet Mock-orange	9'	4	E
<b>Rhamnus frangula 'Columnaris'</b>	Tallhedge Buckthorn	12'	2	E
<b>Rosa multiflora</b>	Japanese Rose	10'	5	B
<b>Rosa setigera</b>	Prairie Rose	15'	4	E
<b>Spiraea × vanhouttei</b>	Vanhoutte Spiraea	6'	4	E
<b>Syringa amurensis japonica</b>	Japanese Tree Lilac	30'	4	E
<b>Syringa × chinensis</b>	Chinese Lilac	15'	5	E
<b>Syringa josikaea</b>	Hungarian Lilac	12'	2	E
<b>Syringa × prestoniae</b>	Preston Lilac	9'	2	E
<b>Syringa vulgaris</b>	Common Lilac	20'	3	E
<b>Taxus cuspidata</b>	Japanese Yew	50'	4	B

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# ARNOLDIA



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## A CHECK-LIST OF CULTIVAR NAMES IN WEIGELA

IN 1929 L. H. BAILEY CONSIDERED "The Case of *Diervilla* and *Weigela*" (Gent. Herb. 2: 39-54. 1929) and concluded that the two genera were truly distinct morphologically and geographically, as well as horticulturally. His review of the history of these two genera is complete and need not be repeated. A third taxon at the generic level, *Calyptrostigma*, was also recognized by Bailey as containing "at least two species in Eastern Asia. . ." and "little known in cultivation, as they are usually rather difficult to grow." Nakai (Jour. Jap. Bot. 12: 1-17. 1936) did not agree with Bailey and combined *Weigela* and *Diervilla* and proposed two new genera. He published the genus *Weigelastrum* to contain *Diervilla maximowiczii* and he substituted the name *Macrodiervilla* for the illegitimate *Calyptrostigma* which Bailey had accepted under different rules of nomenclature. Rehder (Jour. Arnold Arb. 20: 429-431. 1939) reduced both of Nakai's genera to sectional rank and accepted Bailey's recognition of *Weigela* and *Diervilla*. Rehder's treatment is followed by most American horticulturists, although some nurserymen still list species and varieties of *Weigela* under the name *Diervilla*, or under both names, and often indiscriminately.

The situation is confused in modern treatments from Europe. In England, Bean's *Trees and Shrubs Hardy in the British Isles* recognizes only *Diervilla* and this is also the treatment given in the Royal Horticultural Society's *Dictionary of Gardening*. Victor Chaudun who prepared the pertinent treatment for the new edition of *Le Bon Jardinier* also considers *Diervilla* the proper name, crediting it incorrectly to Adanson however, and not to Miller, and noting, also incorrectly, "*Weigelia* (et non *Weigela*)." In the second edition of Parey's *Blumengärtnerei* (ed. 2, 1958-61) and in his *Handbuch der Laubgehölze* (1959-62) Krüssmann recognizes both *Diervilla* and *Weigela* for Germany.

Many of the authors who separate the genera *Diervilla* and *Weigela* employ in keys the useful but unconvincing characteristics of bilabiate *versus* regular corollas and yellow *versus* white, rose, scarlet or green colors for these genera respectively. Considering only these distinctions, other authors, as noted above, combine the genera under the name *Diervilla*. Bailey has made the case for the separation much more convincingly and his article is worth more serious consideration.

In the preparation of this check-list of cultivar names of *Weigela* Thunb., the treatment followed is that given by Rehder in his *Manual of Cultivated Trees and Shrubs* and documented in his *Bibliography of Cultivated Trees and Shrubs*. Rehder recognizes in these treatments the many hybrids between species, a fact established much earlier by Carrière when he published the category "Hybrid Group." More recently Janina Poszwinska in an article on the progeny analysis of some *Weigela* crosses (*Arboretum Kórnickie Rocznik* 6: 143-167. 1961) shows the free crossability of species in the three sections *UTSUGIA*, *CALYSPHYRUM*, and *WEIGELASTRUM*. Rehder has suggested the further crossing of hybrids between species and of back-crossing before the selection of some of the named cultivars. In the check-list which follows no attempt has been made to associate the cultivar with a species beyond the reference given by the original author.

According to the *Code of Nomenclature for Cultivated Plants* (Article 18), cultivar names are transferred without change when the botanical name is changed. Many of the cultivar names in the check-list have been published only under the name *Diervilla* but from the descriptions these taxa are clearly referable to *Weigela*. There is no provision in the rules of nomenclature for indicating such a bibliographic or taxonomic change.

The names of the cultivated plants in the check-list which follows have been obtained from many sources, including nursery catalogues and horticultural magazines. The taxa grown by botanical gardens and arboreta in the United States and in Europe are also included if their names were supplied to me by their staff members or included in their publications. The names encountered include many misspellings, poor or erroneous translations, and commercial synonyms. These names have been given in the list, often without reference to the source, to permit the correction of names or spellings maintained in error.

This compilation is called a check-list deliberately, to indicate several differences from the registration lists published previously in *Arnoldia* for other genera. A monographic study of *Weigela* has not been attempted in the preparation of this list. The comprehensive work of two colleagues in Europe to this end is known and their work may clarify some of the problems encountered in the present task. It is hoped that the bibliographic citations, particularly for American literature, will be of value to their studies.

In the list which follows, no attempt has been made to evaluate the plants. Descriptive phrases are given when supplied by the original author or when nearly contemporary with the original publication. The bibliographic procedure of the earlier registration lists (*Quart. Newsl. Am. Assoc. Gard. Arb.* 64: 9-11. 1965) has been followed in this publication. An attempt is made to supply the

name of an author or a bibliographic citation for all cultivar names or names applied to plants developed in cultivation. In some cases it is clear that older references do exist but where exact references were not available or could not be checked, the name may be credited to a more recent author.

Cultivar names which are clearly acceptable and represent plants which can be identified are given in LARGE and SMALL CAPITAL LETTERS. Other names in the list can not be identified with a plant, are homonyms from which a single name must be selected by a future worker or, are to be rejected.

An asterisk (\*) following a name indicates that a plant is grown under that name by at least one botanical garden or arboretum which supplied information for this list, or has been offered recently under the name in the publications of a commercial nursery. No attempt has been made to check the accuracy of identity of such listings or the availability of such cultivated plants. Information on the location of authentic, named clones representing cultivars in this list is desired. Any corrections or additions to the list or the bibliography given will be appreciated.

'A. Carrière' \* (Van Houtte, Ghent, Belg., Cat. 190-1, p. 49. 1880-81). Probably a spelling variation of 'Abel Carrière'.

'A. Lavallée' = 'LAVALLET'.

'ABEL CARRIÈRE' \* (Lemoine 1876 ex Krüssman Handb. Laubgeh. 2: 571. 1962). The Lemoine reference cannot be located. Krüssman describes the plant as large flowered, free, bright rose carmine red, corolla throat flecked with gold; buds purple-carmine.

'Alba' \* (Van Houtte, Ghent, Belg., Cat. 121, p. 42. 1868). Described as "amabilis rosea" = *coraeensis* 'Alba'.

'Alba' \* (Carrière, Revue Hort. 1861: 331, plate. 1861). Described by Carrière as *Weigelia alba* Hort. and referred to *W. rosea alba*. A distinctive, very floriferous shrub, everblooming, with flowers a glazed or faience white with the long narrow tube slightly orange or rose carmine. Leaves sinuate and undulate on the margin, often crisped. Flowers so rarely truly white that Carrière proposed the name 'Mutabilis' to replace 'Alba'. Treated by Rehder as *W. florida* f. *alba* (Carr.) Rehd.

'Alba' (Carrière, Revue Hort. 1877: 300. 1877). Vigorous shrub, leaves relatively narrow, finely dentate and serrate, apex long acuminate; flower buds yellow-pink opening to a pure white. Grown from seed of 1874 and flowered in 1876-7. More hardy than "*W. Nivea* Sieb.", the only other pure white flowered *Weigela*, which is delicate and requires special soils.

'Alba' (Zabel in Beissner et al. Handb. Laubh.-Benenn. 466. 1903). Published without description as *D[iervilla] hortensis alba*. Currently referred to *W. hortensis* f. *albiflora*.

'Alba' (Several botanical gardens list "*W. japonica alba*" for which no published reference has been found).

'Aldenham Glow'.\* Plants so listed by the Royal Botanic Gardens, Kew, England, were received from Vicary Gibbs in 1926. No validating reference has been found.

- 'Alphonse Lavallée' (Pépinières Minier, Angers, Fr., Cat. p. 51, Autumn 1960).  
Published without description. A probable spelling variation for 'LAVALLEE'.
- 'Andenken an Frau van Houtte' (Späth, Späth-buch 1720-1920, 233. 1921).  
Commercial synonym of 'Memoire de Mme. Van Houtte'.
- 'Andreas Leroy' (Späth, Späth-buch 1720-1920, 233. 1921). Flowers medium sized, rose with rose-white spots; buds dark rose. Possibly the same as 'MONSIEUR ANDRÉ LEROY'.
- 'Angustifolia' (Froebel in Beissner et al. Handb. Laubh.-Benenn. 465. 1903).  
Cited under *D[iervilla] florida* but without description.
- 'ANDRÉ THOUIN' \* (Lemoine & Fils, Nancy, Fr., Cat. 91, p. 26. 1882).  
Described as a hybrid of *W. coraeensis* and *W. florida*. Flowers medium sized, narrow tubed, brownish-red outside, pale purple inside.
- 'Andre Thourin'. A common misspelling of 'ANDRÉ THOUIN'.
- 'Anmutige' (Späth, Späth-buch 1720-1920, 233. 1921). A commercial synonym for 'GRACIEUX' published as *W. praecox* Anmutige.
- 'Arborescens' (Hort. ex Dippel, Handb. Laubh. 1: 274. 1889). Referred by Rehder to *W. floribunda* f. *grandiflora*.
- 'Argenteo-marginata Variegata' (Leonard Nurs., Piqua, Ohio, Cat. 1932).  
Without further description.
- 'ARLÉQUIN' (Anon. in Revue Hort. 1879: 300. 1879). Milky white flowers with lilac or darker flowers in same or different inflorescences. Long lasting. Published as *W. hortensis* arléquin.
- 'Atropurpurea' (Beardslee Nurs., Perry, Ohio, Wholesale Price List, p. 4. 1961). Given as *W. florida atropurpurea*, a source of 'JAVA RED'.
- 'Atrosanguinea' (Daisy Hill Nurs., Newry, Irel., Cat. 101, p. 123, undated).  
Flowers bright crimson inside, deep rose outside. "Very good and free."
- 'AUG. WILHELM' \* (Lemoine & Fils, Nancy, Fr., Cat. 88, p. 24. 1881). Flowers well opened, widely bell-shaped, red-orange.
- 'Augusta' (Dieck, Zöschen, Ger., Cat. Suppl. p. 9. 1887). Published without description.
- 'Auguste Wilhelm' (Hesse Baumsch., Weener-Ems, Germ., Preisverz. 1908-1909, p. 55). Published without description. Probable spelling variation of 'AUG. WILHELM'.
- 'Aurea'. A name commonly used in European gardens, often as "florida aurea."  
No valid publication has been discovered.
- 'Aureo Marginata' (Daisy Hill Nurs., Newry, Ire., Cat. 101, p. 123, undated).  
Published as *W. amabilis aureo marginata* and reported to have "leaves beautifully bordered with yellow."
- 'AVALANCHE' \* (Lemoine & Fils, Nancy, Fr., Cat. 173, p. viii. 1909). Flowers in panicles, remaining pure white until they fall; plant vigorous and very floriferous.
- 'AVANT-GARDE' \* (Lemoine & Fils, Nancy, Fr., Cat. 164. p. viii. 1906).



Flowers large in horizontal clusters, well open, showing marbled pink throat spotted with cream, extending to a brilliant rose. Leaves hidden by the enormous profusion of flowers.

'Avante Gardé'. A spelling variation for 'AVANT-GARDE'.

'BALLET' \* (Broertjes, Jaarb., Proef. Boomk., Boskoop, Netherl. p. 70. 1958). A cross of W. 'Boskoop Glory' and W. 'Newport Red'. Medium high shrub with dark pinkish-red flowers. A full description was published by Schneider in 1963 (Nederl. Dendr. Ver. Jaarb. 22: 70).

'BAYARD' \* (Lemoine & Fils, Nancy, Fr., Cat. 124, p. 29. 1893). A name published without description.

'BÉRANGER' \* (Lemoine & Fils, Nancy, Fr., Cat. 88, p. 24. 1881). A medium-sized shrub with dark brownish-red flowers, purple margined within and the throat yellow spotted. Similar to *Rhododendron ponticum* in color according to Lemoine.

'Bezaubernde' (Späth, Späth-buch 1720-1920, 233. 1921). A commercial synonym of 'SEDUCTION' offered as W. *praecox* Bezaubernde.

'Bicolor' (Daisy Hill Nurs., Newry, Irel., Cat. 101, p. 123, undated). Offered as W. *corensis bicolor* with rose and creamy white flowers on the same bush.

'BICOLOR' (Parsons & Sons Co., Flushing, N. Y., Descr. Cat. p. 12. 1884). Offered as W. *middendorffiana bicolor*. The lower lip of the corolla marked and dotted with purple. Not too hardy.

'BIFORMIS' \* (Baudriller, Gennes (Maine-et-Loire), Fr., Cat. Gén. 43, p. 145. 1880). A plant producing at one time large flowers of a deep-rose color and small or medium-sized flowers of pale-rose color often striped.

'Blütenmonat' (Späth, Späth-buch 1720-1920, 233. 1921). A commercial synonym of 'FLOREAL' offered as W. *praecox* Blütenmonat.

'Boquet' (Bonnell Nurs., Renton, Washington, Cat. p. 19. 1946). Deep rose-pink flowers. Probably the same as 'Bouquet Rose' of Lemoine.

'BOSKOOP GLORY' \* (F. J. Grootendorst and Sons Nurs., Boskoop, Netherl., Wholesale Price List (U. S. ed.), p. 38. 1954-5). Large flowers, salmon pink in color. An entirely new color.

'Boule Rose' (Horton Nurs., Painesville, Ohio, Price List 1955-56, p. 173). Published without description.

'BOUQUET ROSE' \* (Lemoine & Fils., Nancy, Fr., Cat. 143, p. x. 1899). Flowers large, well open, satin rose, with straw-colored spots on the throat; flowers by the 5th of May. Listed under W. *praecox*.

'BRIGHTNESS' (Watsons Nurs., Dublin, Irel., Fruit Trees and Shrubs, Cat. p. 42. 1937). "Crimson flowered, a dwarf Eva Rathke."

'Bris de Mai' \* (Greenbrier Farms, Norfolk, Virginia, Cat. p. 39. 1943). A small shrub with very red flowers. Blooms all summer. Plant Introduction #135263.

'Bristol'. A name used by many U. S. nurseries for 'BRISTOL RUBY'.

- 'BRISTOL RUBY' \* (Alex Cummings, Bristol, Conn. Plant Patent #492. 1941). "Hybrids of *W. rosea* and *W. 'Eva Rathke'*. Color of *Eva Rathke* but habit more erect and more vigorous and hardier."
- 'BRISTOL SNOWFLAKE' \* (Bristol Nurs., Bristol, Conn., Spring Cat., last cover, 1961). Flowers goblet shaped, gleaming white, almost everblooming from June and July until well into the fall. To 8 feet tall at maturity. Hardy in Iowa and Vermont. "A seedling of the superb Bristol Ruby."
- 'BUISSON FLEURI' (Lemoine & Fils, Nancy, Fr., Cat. 179, p. 6. 1911). Compact panicles, flowers large, rosy to carmine mauve, throat spotted with yellow.
- 'BURFORD' (Treasure & Sons, Treasures of Tenbury Wells, Engl. Undated catalogue probably 1959, p. 18). A free flowering variety with delicate, fragrant, rose-pink flowers. "Found on the property when the present owner bought it."
- 'CAMÉLÉON' \* (Carrière, *Revue Hort.* **1868**: 240. 1868). A selection made by M. Billiard of Fontenay-aux-Roses. Abundant flowering, flowers at first pure white then becoming deep rose; leaves long acuminate at the apex.
- 'Caméléonflora' (Pép. F. Delaunay, Angers, Fr., Cat. p. 19. 1913-14). Published without description.
- 'CANDIDA' \* (Carrière, *Revue Hort.* **1879**: 130, *plate.* 1879). *W. candida*. A selection made by Thibault and Keteleer. Flowers moderately large, pure white.
- 'Candidissima'.\* Attributed to A. Waterer Nurs., Woking, Engl. 1887. No reference seen.
- 'Cardinal Red' (Krüssmann, *Handb. Laubgeh.* **2**: 571. 1962). Published without description and reported as a commercial synonym in the U. S. for 'NEW-PORT RED'. No supporting U. S. reference available.
- 'CARMINEA' \* (Van Houtte, Ghent, Belg., Cat. 136 M, p. 43. 1870-71). Given as *W. hybrida carminea* without description. Carrière (*Revue Hort.* **1875**: 212. 1875) describes the buds as a livid black, a little grayish, of a red-purple wine color on all parts.
- 'CARRIÈRE' (Baudriller, Gennes (Maine-et-Loire), Fr., Cat. Gén. p. 146. 1880). Described as flowers white, passing into rose and late flowering. Certainly different from modern descriptions of 'Abel Carrière' which has been suggested as the correct name.
- 'Carrieri'. A frequent misspelling in U. S. nursery catalogues but it is not clear which cultivar is intended.
- 'Chamaeloes'. A misspelling, primarily in Dutch nursery catalogues, for *Chamaeleon* or *Caméléon*.
- 'Chamaeleon'. A spelling variation of 'Caméléon'.
- 'CHECKERBOARD' (Beardslee Nurs., Perry, Ohio, Wholesale Price List, p. 11. 1964). A mutation of *W. candida*, with clear-white and clear-pink flowers at the same time. Selected in 1956 and registered in 1964.

- 'Coccinea' \* (Dieck, Zöschchen, Germ., Cat. Nat.-Arb. p. 34. 1885). Listed as *W. rosea coccinea* Hort., without description.
- 'Cocquette'. \* A spelling variation in nursery catalogues for 'CONQUÊTE'.
- 'CONGO' \* (Lemoine & Fils, Nancy, Fr., Cat. 104, p. viii. 1886). Floriferous, flowers large, purple chamoise.
- 'CONQUERANT' \* (Lemoine & Fils, Nancy, Fr., Cat. 158, p. viii. 1904). Flowers extremely large, perfectly formed, red to darker wine color, throat and exterior carmine. Plants with heavy foliage. Variety of *W. praecox*.
- 'CONQUÊTE' \* (Lemoine & Fils, Nancy, Fr., Cat. 134, p. x, 1896). Largest flowers known in *Weigela*, not less than 47 mm. long, deep rose.
- 'Conterieri'. A misspelling of 'COUTURIER'.
- 'Coquet' \* (Anon. in Royal Hort. Soc. Proc. 27: xxi. 1902-3). Published without description in a listing of plants shown by Messrs. Robert Veitch of Exeter.
- 'Couquet Rose'. A probable misuse of 'BOUQUET ROSE'.
- 'COUTURIER' (Baudriller, Gennes (Maine-et-Loire), Fr., Cat. Gén. p. 146. 1880). Selection of *Weigela hybrida*. Flowers white changing to rose. Late flowering. Probably = MADAME COUTURIER.
- 'Crimson Hybrid' (Plant Buyer's Guide, 5th ed. p. 258. 1949). Cited catalogue cannot be located and distributor has no record of origin of plant or of name.
- 'DAME BLANCHE' \* (Lemoine & Fils, Nancy, Fr., Cat. 152, p. viii. 1902). A vigorous plant with very large flowers, ivory white with yellow throat.
- 'Dannewitz' (Timm & Co., Elmshorn, Germ., Cat. p. 226. 1955-56). Published without description. No longer offered by the company and no later description is available.
- 'DAUBENTON' \* (Lemoine & Fils, Nancy, Fr., Cat. 104, p. 17. 1886). A floriferous plant, flowers large, deep yellow lacking any red inside but red crimson outside.
- 'DE JUSSIEU' (Lemoine & Fils, Nancy, Fr., Cat. 90, p. 3. 1882). Flowers yellow inside, the lobes pale rose, the exterior carmine.
- 'Deboisi'. A misspelling of 'DESBOISII'.
- 'DESBOISII' \* (Carrière, Revue Hort. 1861: 332. 1861). More vigorous than 'Groenewegenii' and more ramified with the leaves larger and softer. Flowers but once. Corolla wide mouthed, deep red almost carmine.
- 'DESCARTES' \* (Lemoine & Fils, Nancy, Fr., Cat. 118, p. 28. 1891). Flowers very large, blood-red-purple.
- 'DIDEROT' \* (Lemoine & Fils, Nancy, Fr., Cat. 103, p. 34. 1886). Enormous flowers, brilliant red in color.
- 'Disantha' \* (Krüssmann, Deutsch. Baumsch. 10: 12. 1958). Published without description.
- 'Docteur Baillon' = Dr. Baillon.

- 'Downie' (Pép. F. Delaunay, Angers, Fr., Cat. p. 19. 1913-4). Published without description.
- 'DR. BAILLON' \* (Van Houtte, Ghent, Belg., Cat. 180 A, p. 54. 1878-79). Published without description.
- 'Dr. Baillou'. Misspelling of 'Dr. Baillon'.
- 'DR. BULLIARD' \* (Bailey, Stand. Cycl. Hort. 1009. 1914). Flowers carmine. A cross of "*D. florida* and *D. japonica*."
- 'DROPMORE PINK' \* (F. L. Skinner, Dropmore, Manitoba, Canada — Registered A.A.N. 1951). Characterized by extreme hardiness. Selected from seedlings of imported Manchurian seed.
- 'Dropmoreana'. Misuse of 'Dropmore Pink' by several U. S. nurseries.
- 'Duchartie' (Daisy Hill Nurs., Newry, Irel., Cat. 101, p. 124, undated). "Rose, good." Probably the same as 'P. Duchartre'.
- 'E. Andre'. Variation in spelling of 'Ed. André' used by U. S. nurseries.
- 'ED. ANDRÉ' \* (Van Houtte, Ghent, Belg., Cat. 180 A, p. 54. 1878-79). Published without a description. Lemoine (Nancy, Fr., Cat. 88, p. 24. 1881) describes the taxon as a hybrid of *W. arborea* and *W. 'Lavallei'* having flowers purple brown inside, the stamens white contrasting with the brown black of the outside.
- 'Edouard André'. A spelling variation of 'ED. ANDRÉ'.
- 'Eduard Andree'. A spelling variation of 'ED. ANDRÉ'.
- 'Elisabeth'. Variation in spelling for 'Elizabeth' used by German nurseries.
- 'Elizabeth' (Späth Baumsch., Berlin, Germ., Hauptkat. 89, p. 118. 1892). Published without description except for phrases "sehr schön, wenig bekannt."
- 'EMILE GALLÉ' \* (Lemoine & Fils, Nancy, Fr., Cat. 88, p. 24. 1881). Flowers medium sized, carmine purple, brilliant.
- 'Emile Gallet'. Variation in spelling for 'EMILE GALLÉ'.
- 'Eroberer' (Späth, Späth-buch 1720-1920, 233. 1921). A commercial synonym of 'CONQUÉRANT' given as *W. praecox* Eroberer.
- 'ESPÉRANCE' \* (Lemoine & Fils, Nancy, Fr., Cat. 164, p. viii. 1906). Numerous panicles of very large flowers, pale white, rose tinted and rose-salmon outside, buds salmon, pale. One of the earliest to bloom.
- 'Eva Katke'. A misspelling of 'EVA RATHKE'.
- 'EVA RATHKE' \* (Rathke in Lemoine & Fils, Nancy, Fr., Cat. 122, p. 17. 1892). Flowers large, erect, red crimson. Cited as *Weigela hybrida*.
- 'EVA SUPREME' \* (Broertjes, Jaarb. Proef. Boomk., Boskoop, Netherl., p. 70. 1958). Growth vigorous, flowers bright red. An improved 'Eva Rathke'. Schneider published a full description in 1963 (Nederl. Dendr. Ver. Jaarb. 22: 70).
- 'EXCELSA' (Carrière, Revue Hort. 1873: 279. 1873). Vigorous shrub to 3 m. tall, scarcely branched, heavy flowering, rose tinged violet, deep rose. Published as *Weigela excelsa*.

- 'Extus Coccinea' (Van Houtte, Ghent, Belg., Cat. 170 QQ, p. 57. 1876-77). Reference not available for checking.
- 'Fairy'. An incorrect translation by U. S. nurseries for 'FÉERIE'.
- 'FÉERIE' \* (Lemoine & Fils, Nancy, Fr., Cat. 199, bis, p. 6. 1926). Upright trusses of large rose-pink flowers which hide the foliage. Correct translation of this name is 'fairy art' or 'enchantment'.
- 'Ferieri'. Misspelling by U. S. nurseries for 'FÉERIE'.
- 'Ferri'. Misspelling by U. S. nurseries for 'FÉERIE'.
- 'FIESTA' \* (Broertjes, Jaarb. Proef. Boomk., Boskoop, Netherl., p. 70. 1958). A cross of 'Eva Rathke' and 'Newport Red'. Growth moderate, a lax shrub; flowering copious with shining uniform-red flowers. Schneider published a full description in 1963 (Nederl. Dend. Ver. Jaarb. 22: 70).
- 'Flavo-fusca' (Dieck, Zöschen, Germ., Cat. Nat. Arb., p. 33. 1885). A selection published as *D. japonica floribunda flavo-fusca* Hort. Flowers are greenish, not beautiful but interesting. Probably the same as 'Fusca-flavo' of Van Houtte.
- 'FLEUR DE MAI' \* (Lemoine & Fils, Nancy, Fr., Cat. 143, p. x. 1899). Clusters of flowers close together, buds purple, open corolla marbled purple rose outside, salmon rose inside.
- 'Flor de Mai'. Misspelling by U. S. nurseries for 'FLEUR DE MAI'.
- 'FLORÉAL' \* (Lemoine & Fils, Nancy, Fr., Cat. 149, p. viii. 1901). Early flowering, flowers very large, produced in large bunches, delicate rose with reflexed, mauve petals, mouth carmine-wine color. A selection of *W. praecox*.
- 'Floribunda' \* (Carrière, Revue Hort. 1874: 350. 1874). Compact shrub of medium vigor, leaves oval cordate, strongly nerved, tomentose, heavily flowered, flesh colored, tubular. Description accompanied by a colored plate. Described as *Weigela floribunda*. Although subsequently used by many nurseries as a cultivated variety, this is clearly *W. floribunda* (Sieb. & Zucc.) Koch.
- 'Floribunda Grandiflora'. Name incorrectly used as a cultivar. See 'GRANDIFLORA'.
- 'Folia Aurea Media Picta' (Van Houtte, Ghent, Belg., Cat. 215 D, p. 48. 1885-86). A novelty cited as "*fol. aur. medio pictis*."
- 'Folia Variegata' (Van Houtte, Fl. Serres 12: 15. 1857). Published as "fol. var." Plants raised from seed by Dr. Desbois of Van Houtte Nurseries. A pyramid in shape, one meter tall. Not a single leaf uncolored.
- 'Folia Aurea' (Hesse Baumsch., Weener-Ems, Germ., Preisverz. 1908-09, p. 55). Published without description.
- 'FOLIA PURPUREA' \* (Hillier & Sons, Winchester, Engl., Trees and Shrubs Cat. 39T p. 73, 1930). A slow growing compact shrub with bronze-purple foliage and purple flowers.
- 'FRAÎCHEUR' \* (Lemoine & Fils, Nancy, Fr., Cat. 158, p. 26. 1904). Irregular flowers with white edges, the exterior rose, the throat cream. Selection of *W. praecox*.

- 'Frischfarbige' (Späth, Späth-buch 1720-1920, 233. 1921). A commercial synonym for 'FRAÎCHEUR' published as *W. praecox* Frischfarbige.
- 'Frau Lemoine' (Späth, Späth-buch 1720-1920, 233. 1921). A commercial synonym of 'MADAME LEMOINE'.
- 'Frau Teillier' (Späth, Späth-buch 1720-1920, 233. 1921). A commercial synonym of 'MADAME TELLIER'.
- 'Frühlingsblüte' (Späth, Späth-buch 1720-1920, 233. 1921). A commercial synonym of 'LE PRINTEMPS'.
- 'Fusco-flava' (Van Houtte, Ghent, Belg., Cat. 142 Q, p. 17. 1872-73). Published as *W. rosea floribunda fusco-flava* without additional description.
- 'GAVARNI' (Lemoine & Fils, Nancy, Fr., Cat. 97, p. 26. 1884). Flowers red carmine with a beautiful form.
- 'Giganteaeflora' (Hesse Baumsch., Weener-Ems, Germ., Preisverz. 1908-1909, p. 55). Published as *Diervilla hortensis giganteaeflora* without further description. Hesse Preisliste of 1928-29, p. 106, describes the flowers as translucent, dull carmine.
- 'Giganteaeflora Gratissima' (Hesse Baumsch., Weener-Ems, Germ., Preisverz. 1908-1909, p. 55). Cited as *Diervilla hortensis giganteaeflora gratissima* without further description.
- 'Gigantifolia' (Plant Buyer's Guide, 6th edition p. 295. 1958, credits this name to F. Delaunay Nurs., Angers, Fr., but the name is apparently a misspelling of 'Gigantiflora'.
- 'Gigantiflora' \* (Van Houtte, Ghent, Belg., Cat. 170 QQ, p. 57. 1876-77). Published without further description.
- 'GIRONDIN' \* (Lemoine & Fils, Nancy, Fr., Cat. 185, p. 6. 1913). Horizontal panicles of numerous flowers, carmine with brighter red throat. The outside and the buds are a warmer carmine.
- 'GLOIRE DES BOSQUETS' \* (Lemoine & Fils, Nancy, Fr., Cat. 88, p. 24. 1881). Large racemes of large flowers, rose purple with yellow center.
- 'Gloire des Casquet'. A misspelling of 'GLOIRE DES BOSQUETS'.
- 'GLORIEUX' \* (Lemoine & Fils, Nancy, Fr., Cat. 158, p. viii. 1904). A selection of *W. praecox* which flowers early with numerous flowers of good shape. Lacquered mauve colored with deeper veins.
- 'Golden' (Lovett's Nurs., Little Silver, New Jersey, Cat. 1947, p. 22). "Most desirable variety."
- 'GOLDEN HORN' \* (J. Waterer, Sons, & Crisp, Twyford, England, Cat. 1928-29, p. 43). A new seedling raised at the Bagshot Nursery with an "elegant yellow horn."
- 'GORDONIANUS' (Lovett's Nurs., Little Silver, New Jersey, Trade List p. 11. 1926). Originally published without description but listed in the Spring Catalogue of 1927, page 7, as "pink flowered."
- 'GRACIEUX' \* (Lemoine & Fils, Nancy, Fr., Cat. 158. p. viii. 1904). A selec-

- tion of *W. praecox*. Flowers large, round, the throat sulfur-yellow, the buds salmon in color. Plants erect, extremely floriferous.
- 'GRACILIFLORA' (Carrière, *Revue Hort.* **1875**: 211. 1875). Plant of medium vigor with diverging branches. Buds wine colored, flowers rose to clear violet. A short flowering period. Published as *Weigela graciliflora*.
- 'GRACILIS' (B. Ruys, Koninklijke Kweekrij Moerheim, Dedemsvaart, Netherl., *Handels-Cat.* p. 16. 1945-46). Large pink flowered.
- 'GRANDIFLORA' \* (Briot, *Revue Hort.* **1867**: 268. 1867). Published as *W. arborea grandiflora* noting its special characteristics. A vigorous, woody growth, large leaves with finely dentate edges, flowers sulfur-white, passing to pale rose wine. Flowers within a calyciform involucre of linear bracts to 15 mm. in length. Origin unknown.
- 'Grandiflora Alba' \* (Dippel, *Hand. Laubh.* **1**: 274. 1889). White flowered.
- 'GRANDIFLORA FLORE-ALBA' (Lemoine & Fils, Nancy, Fr., *Cat.* 92, p. 11. 1882). A variety introduced from Japan with pure white flowers.
- 'GRANDIFLORA SULFUREA' (Dieck, Zöschen, Germ., *Haupt-Cat.* p. 33, 1885). Flowers golden.
- 'Gratissima' \* (Lemoine & Fils, Nancy, Fr., *Cat.* 88, p. 24. 1881). Published as *W. hortensis gratissima* without further description.
- 'Greenway'. A common misspelling by U. S. nurseries for 'Groenewegenii'.
- 'GROENEWEGENII' \* (Carrière, *Revue Hort.* **1861**: 332. 1861). Plants reported to be less ramified than *W. amabilis* with stems larger, leaves shiny and flowers deeper in color. Krüssman (*Handb. Laubgeh.* 571. 1962) credits this name to "Van Houtte 1859" a reference not available.
- 'Groenewegiana'. A misspelling of 'Groenewegenii'.
- 'Groenowegenei' (Carrière, *Revue Hort.* **1875**: 131. 1875). Carrière remarks the plant was dedicated to a Dutch horticulturist, M. Groenowegen. The correct spelling cannot be determined at the present time.
- 'Gustav Maillot'. A misspelling of 'GUSTAVE MALET'.
- 'Gustav Mallet'. A misspelling of 'GUSTAVE MALET'.
- 'Gustav Mallot'. A misspelling of 'GUSTAVE MALET'.
- 'GUSTAVE MALET' \* (Carrière, *Revue Hort.* **1868**: 240. 1868). A selection from *W. rosea* by M. Billiard, Fontenay-aux-Roses. Plants exceedingly floriferous; flowers long, tubular, deep red, the petals wide spreading.
- 'Gustave Mallet'. A misspelling of GUSTAVE MALET'.
- 'Gustave Mallot'. A misspelling of 'GUSTAVE MALET'.
- 'Harlequin'. A commercial synonym in the U. S. for 'ARLÉQUIN'.
- 'Henderson'. A commercial synonym in the U. S. for 'HENDERSONII'.
- 'Henderson's Pink'. A commercial synonym in the U. S. for 'HENDERSONII'.
- 'HENDERSONII' \* (Van Houtte, Ghent, Belg., *Cat.* 136 M, p. 43. 1870-71). Listed without description. Bonard (*Hort. Fr.* **1870**: 49. 1870) describes

- the plant as having beautiful rose-colored flowers and being offered for sale by Lemoine.
- 'Heroine' (Lemoine & Fils, Nancy, Fr., Cat. 134, p. x. 1896). Stems erect, flowers large, pale rose.
- Hybrid Group (Carrière, *Revue Hort.* **1875**: 211. 1875). A group made by artificial fertilization between *W. rosea* and *W. multiflora* by Lemoine which includes 'Hendersoni', 'Lowi', 'Lavallei', 'Kermesina', 'Carminea', and 'Lemoinei'. *Weigela hybrida* Jäger in Jäger & Beiss. *Ziergeh. Gärt. & Park.* 2nd ed. p. 422. 1884, is given as "nomen omnes formas hybridas amplectens."
- 'IDÉAL' \* (Lemoine & Fils, Nancy, Fr., Cat. 199 bis, p. 6. 1926). A beautiful May flowering shrub. Flowers medium sized, carmine rose inside, bright carmine outside. Krüssmann (*Handb. Laubgeh.* 571. 1962) attributed this name to "Lemoine 1896." The reference is not available.
- 'Incarnata' \* (Baudriller, Gennes (Maine-et-Loire), Fr., Cat. Gén. p. 146. 1880). Published without description.
- 'Intermedia' \* (R. B. Parsons & Co., Flushing, N. Y., Amer., Cat. p. 13. 1873). Given without description.
- 'Isolene'. A misspelling of 'ISOLINE'.
- 'Isolinae' (Van Houtte, Fl. Serres, **14**: plate 1445. 1861). The spelling used on the illustration in contrast to 'Isoline' used in the text.
- 'ISOLINE' \* (Van Houtte, Fl. Serres **14**: 142. 1861). Flowers white, throat pale yellow with a large spot of gold on the lower surface. Description also gives a reference to Van Houtte, Catalogue 87 which is not available. In 1875 Carrière (*Revue Hort.* **1875**: 129) considered this a variety of *W. mutabilis*.
- 'J. Wittwer' (Van Houtte, Ghent, Belg., Cat. 180 A, p. 54. 1878-79). Published without a description.
- 'JAVA RED' \* (Beardslee Nurs., Perry, Ohio, Wholesale Price List 1957). Originally given without a description. The catalogue of 1961, page 4, cites the plant as a selection of "*Weigela florida atropurpurea* — easily grown, red-leaved *Weigela* with clear — pink flower clusters." Registered 1964.
- 'JEAN MACÉ' \* (Lemoine & Fils, Nancy, Fr., Cat. 90, p. 4. 1882). Flowers large, purple, buds purple-crimson-black. The deepest color of all Weigelas but one of the least floriferous.
- 'John Standish' (Van Houtte, Ghent, Belg., Cat. 180 A, p. 54. 1878-79). Published without a description.
- 'John Wither' (Lemoine & Fils, Nancy, Fr., Cat. 88, p. 25. 1881). Given without a description.
- 'Juvénal' (Lemoine & Fils, Nancy, Fr., Cat. 124, p. 29. 1893). Published without description.
- 'KERMESINA' (Van Houtte, Ghent, Belg., Cat. 136 M, 43. 1870-71). Published without a description but described by Carrière in 1875 (*Revue Hort.* p. 211).
- 'Kongo'. Misspelling of 'CONGO'.



- 'Kosteri Variegata' (Grootendorst, De Boomkweikerij Jg. 5: 11. 1949). Attributed to C. de Vos in 1885. A reference which cannot be located.
- 'Kosteriana' \* (Van Houtte, Ghent, Belg., Cat. 152 AA, p. 30. 1873-74). Published without description.
- 'KOSTERIANA FOLIA VARIEGATA' \* (Neubert, Deutsch. Mag. Gart. Blumenk. 1871: 343. 1871). One of the most beautiful of the gold-flecked Weigelas.
- 'Kosteriana Variegata' (Waterer, Knap Hill Nurs., Woking, Engl., Cat. p. 37. 1881-82). Published without description.
- 'La Perce'. A misuse of 'PERLE'.
- 'La Perle'. A misuse of 'PERLE'.
- 'LACÉPÈDE' (Lemoine & Fils, Nancy, Fr., Cat. 104, p. 18. 1886). Flowers large open, rose fuchsia in color, buds crimson.
- 'LAVALLEI' \* (Van Houtte, Ghent, Belg., Cat. 130, p. 233. 1869-70). Originally published without a description. In 1870 Lescuyer (Hort. Fr., p. 145. 1870) reported that Lemoine announced "*Diervilla (Weigelia) hybrida Lavallei*" with parentage of *W. arborea grandiflora* with flowers white and yellow and *W. multiflora* with flowers purple wine in color. Lemoine catalogues of that year are not available.
- 'LE PRINTEMPS' \* (Lemoine & Fils, Nancy, Fr., Cat. 149, p. viii. 1901). Flowers numerous, flesh-rose edged with pink.
- 'Leicester Castle' (Anon. Proc. Roy. Hort. Soc. 79: 64. 1954). Plant of *Weigela* exhibited under this name by the City of Leicester Parks Department. Published without further description.
- 'Lemoinei' (Van Houtte, Ghent, Belg., Cat. 136 M, p. 43. 1870-71). Published without a description. Probably the same as 'MONSIEUR LEMOINE'.
- 'Longifolia Folia Argenteo-marginata' (Dieck, Zöschen, Germany, Cat. Nat.-Arb. Suppl. 1, p. 9. 1887). Referred to *Diervilla rosea* but without further description.
- 'Looymansii' (Krüssmann, Deutsch. Baumsch. 10: 12. 1958). Published without description.
- 'LOOYMANSII AUREA' \* (Van Houtte, Ghent, Belg., Cat. 170 QQ, p. 57. 1876-77). A fine novelty with golden-yellow leaves surrounded with a slender edging of a fine carmine red, very constant. Numerous and magnificent bouquets of beautiful rose flowers.
- 'Lowe'. Misspelling of 'Lowii'.
- 'Lowi' (Van Houtte, Ghent, Belg., Cat. 136 M, p. 43. 1870-71). Published without description but of questionable relationship to 'Lowii'.
- 'Lowii' \* (Lescuyer, Hort. Fr. 1870: pl. 8. 1870). The origin of this plant is attributed to Lemoine as a hybrid of *W. rosea* and *W. multiflora*. It was published as *Weigela lowii*. Flower buds purple crimson, open flowers dragon-blood red.
- 'Lutea'. All references to *Weigela* 'Lutea' are properly *Diervilla lutea*.

- 'Lutea-marginata'. A variation in spelling of 'Luteo-marginata'.
- 'Luteo-marginata' (Bailey, Stand. Cycl. Hort. 1009. 1914) = 'Folia Variegata'.
- 'Madame<sup>1</sup> Abel Carrière'. A misuse of 'MADAME CARRIÈRE' by U. S. nurseries.
- 'Madame Ballard'. A misspelling of 'MADAME BILLIARD'.
- 'MADAME BILLIARD' \* (Carrière, Revue Hort. 1868: 240. 1868). A selection of *W. rosea* made by Billiard, Fontenay-aux-Roses. Branches erect, flowers excessively large, pure white turning rose.
- 'MADAME CARRIÈRE' (Carrière, Revue Hort. 1869: 300. 1869). Flowering branches short, leaves small, slightly warped, pale green, paler below, flowers large, rose-flesh colored and very pale, lobes twisted. Selected from seedling of *W. rosea* by Billiard of Fontenay-aux-Roses.
- 'Madame Coulturier'. A misspelling of 'MADAME COUTURIER'.
- 'MADAME COUTURIER' \* (Carrière, Revue Hort. 1868: 240. 1868). A late flowering variety with numerous white flowers which turn rose. Selected by Billiard, Fontenay-aux-Roses.
- 'Madame Dauvasse'. An error for MONSIEUR DAUVASSE.
- 'MADAME LEMOINE' \* (Späth Baumsch., Berlin, Germ., Cat. 69, p. 120. 1887-88). Flowers a bright rose becoming darker in age. An earlier reference to "Cat. 31" cannot be checked.
- 'Madame Tailler'. A misspelling of 'MADAME TELLIER' by U. S. nurseries.
- 'Madame Teillier'. A misspelling of 'MADAME TELLIER' by German nurseries.
- 'MADAME TELLIER' \* (Carrière, Revue Hort. 1868: 240. 1868). A selection from *W. rosea* made by Billiard, Fontenay-aux-Roses. Erect stems, leaves very pubescent below, folded in development, undulate at the margins; flowers large, blood red.
- 'Madame van Houtte' \* (Dieck, Zöschen, Germ., Haupt-Cat. Suppl. 1, p. 9. 1887). Published without description.
- 'Maiblüte' (Späth, Späth-buch 1720-1920, p. 233. 1921). A commercial synonym for 'FLEUR DE MAI' given as "*W. praecox* Maiblute."
- 'Majestic'. Misspelling or commercial synonym of 'MAJESTUEUX'.
- 'Majestieux'. A misspelling of 'MAJESTUEUX'.
- 'MAJESTUEUX' \* (Lemoine & Fils, Nancy, Fr., Cat. 203 bis, p. 5. 1930). A splendid new sort with tall, upright branches producing a wealth of large, well-expanded and erect flowers in the first week of May; flowers rose-pink flushed with carmine in the throat.
- 'Marc Tellier'. A misuse by Rehder (Man. Cult. Trees & Shrubs 852. 1927) of 'MADAME TELLIER'.
- 'Marginata Alba' (Baudriller, Gennes (Maine-et-Loire), Fr., Cat. Gén. p. 146. 1880). Cited as *Weigela rosea*.
- 'Memoire de Mme. Van Houtte' (Lemoine & Fils, Nancy, Fr., Cat. 97, p. 27. 1884). Published without description.

<sup>1</sup> Mad., Madam, and Mme. are regarded as variant spellings of Madame.

- 'Merveille' (Pépinières Minier, Angers, Fr., Cat. Autumn 1960, p. 51). Published without description.
- 'MESSAGER' \* (Lemoine & Fils, Nancy, Fr., Cat. 179, p. 6. 1911). Flowers large, erect, lobes rounded, rose of China in color with throat solid carmine.
- 'Metelerkamp' (Koch, Dendr. 2: 42. 1872). Published without description.
- 'MONSIEUR <sup>2</sup> ANDRÉ LEROY' (Carrière, Revue Hort. 1869: 300. 1869). Excessively flowering, vigorous, leaves dark green, corolla tube long, open, rose outside, flesh colored inside with spot of yellow, calyx lobes subulate, longer than corolla tube. A selection of *W. rosea*. Grown from seed by Billiard of Fontenay-aux-Roses.
- 'Monsieur Bayard'. Regarded as a variation of 'BAYARD'.
- 'MONSIEUR DAUVESSE' (Carrière, Revue Hort. 1868: 240. 1868). A selection of *W. rosea* made by Billiard, Fontenay-aux-Roses. Extra heavily flowered, branches short, erect, flowers flesh colored not changing with age and long lasting.
- 'MONSIEUR LEMOINE' \* (Carrière, Revue Hort. 1868: 240. 1868). A selection of *W. rosea* by Billiard, Fontenay-aux-Roses. Flowers pale flesh colored becoming rose and finally a deep wine red. Characterized by flowers from white to deep red on one branch.
- 'MONSTRUOSA' (Carrière, Revue Hort. 1878: 47. 1878). Flowers bright red, the small leaves thick and folded, tomentose and disposed in irregular verticils. Published as *Weigela monstrosa*.
- 'Mont Blanc'. A misspelling of 'MONT-BLANC'.
- 'MONT-BLANC' \* (Lemoine & Fils, Nancy, Fr., Cat. 140, p. x. 1898). Extremely vigorous, flowers very large, pure white. The best of the white-flowered forms in cultivation.
- 'MONTESQUIEU' (Lemoine & Fils, Nancy, Fr., Cat. 103, p. 34. 1886). Flowers red fuchsia, buds crimson.
- 'Mt. Blanc'. A misuse of 'MONT-BLANC' by U. S. nurseries.
- 'MULTIFLORA' \* (Carrière, Revue Hort. 1875: 210. 1875). A small compact shrub, inflorescence densely flowered and also compact, buds deep red.
- 'MUTABILIS' (Carrière, Revue Hort. 1861: 331 and *plate*. 1861). Listed both as *W. alba* and *W. rosea alba* with 'Mutabilis' suggested as a new name since few flowers are pure white. In 1875 Carrière (Revue Hort. 1875: 129) used the name "*W. mutabilis*, var. *Isoline*."
- 'Nana Argenteo-variegata' (Den Ouden & Sons Nurs., Boskoop, Netherl., Cat. 1921, p. 55). Published without further description.
- 'Nana Aurea' (Baudriller, Gennes (Maine-et-Loire), Fr., Cat. p. 146. 1880). Published without description.
- 'NANA FOLIA VARIEGATA' (Van Houtte, Fl. Serres 14: 143. 1861). Derivative of *W. rosea*. A small compact plant with flat but colorful leaves.

<sup>2</sup> M. or Mons. as an occasional prefix spelling is treated as Monsieur.

- 'NANA VARIEGATA' \* (Baudriller, Gennes (Maine-et-Loire), Fr., Cat. 43, p. 146. 1880). A small shrub remaining in a ball, leaves margined with yellow.
- 'New Port Red'. A misuse of 'NEWPORT RED'.
- 'Newport'. A misuse of 'NEWPORT RED'.
- 'NEWPORT RED' \* (B. Ruys, Royal Moerheim Nurs., Dedemsvaart, Netherl., Wholesale Cat. 1946-47, p. 16). Splendid red-colored flowers for better growing plant than 'Eva Rathke'. Best regarded as a commercial synonym of 'VANICEK'.
- 'Nikoensis' (Frost afs Skovfröhandel, Borkop, Denm., Cat. 1959). Published without description.
- 'Nivalis' (Agri. Univ. Bot. Gard. & Belmonte Arb., Wageningen, Netherl., Seedlist 1957, p. 3). Published without description.
- 'Nivea' (Carrière, Revue Hort. 1877: 300. 1877). Refers to "W. Nivea Sieb." a reference which cannot be located.
- 'Nivea' (Jäger & Beiss. Ziergeh. Gärt. & Park. 571. 1865). Pure-white, very abundant flowers.
- 'Nivea' \* (Carrière, Revue Hort. 1875: 130. 1875). A dwarf shrub, buds a little fleshy, flowers pure white, flowering midway and long lasting.
- 'Nivea Aurea' (Dieck, Zöschén, Germ., Haupt-Kat. Suppl. 1, p. 9. 1887). Cited as *W. hortensis* f. without further description.
- 'Nivea Blanc' (Pép. F. Delaunay, Angers, Fr., Cat. p. 19. 1913-14). Published as *Wegelia hortensis nivea blanc* without further description.
- 'Nivea Folia Marginalis' (Dieck, Zöschén, Germ., Haupt-Kat., p. 33. 1885). Cited as *D. hortensis* f. without further description.
- 'OTHELLO' \* (Lemoine & Fils, Nancy, Fr., Cat. 91, p. 26. 1882). Flowers narrow, carmine veined, sulfur yellow in center.
- 'P. Duchartre' \* (Van Houtte, Ghent, Belg., Cat. 180 A, p. 54. 1878-79). Published without description. Krüssmann (Handb. Laubgeh. 572. 1962) attributes this cultivar to Lemoine, 1876, a reference I have not been able to verify.
- 'PASCAL' (Lemoine & Fils, Nancy, Fr., Cat. 118, p. 28. 1891). Flowers of medium size, erect, red tinted with crimson.
- 'PAVILLON BLANC' \* (Lemoine & Fils, Nancy, Fr., Cat. 149, p. 26. 1901). Flowers large, white-flesh colored, clusters large. A form of *W. rosea*.
- 'Pécheur Fils' \* (Van Houtte, Ghent, Belg., Cat. 180 A, p. 54. 1878-79). Published without description.
- 'PERLE' \* (Lemoine & Fils, Nancy, Fr., Cat. 152, p. viii. 1902). Vigorous, flowers large in hemispheric corymbs of 10-12 flowers, pale cream with rose edges, the mouth clear yellow.
- 'Pink Fairy'. A reference in Plant Buyer's Guide, 6th ed. p. 295. 1958. Cannot be verified. Probably a misuse of FÉERIE.

- 'Prachtblüte' (Späth, Späth-buch 1720–1920, p. 233. 1921). A commercial synonym of 'GLORIEUX' cited as *W. praecox* Prachtblüte.
- 'President Duchartre' \* (Baudriller, Gennes (Maine-et-Loire), Fr., Cat. p. 146. 1880). Clear amaranthe, flowers large, open, erect; stems straight. Perhaps the same as 'P. Duchartre' of Van Houtte and Lemoine.
- 'PROCUMBENS' (Carrière, Revue Hort. **1879**: 60. 1879). A prostrate plant for rock gardens. Flowers rose, the mouth white on the inside. Published as *Weigela procumbens*.
- 'PROFUSION' \* (Lemoine & Fils, Nancy, Fr., Cat. 189, p. 16. 1915). *Diervilla japonica* crossed with an early flowering type produced these seeds. Plants with clusters of 20 flowers, these horizontal, carmine red.
- 'PURPURATA' (Van Houtte, Ghent, Belg., Cat. 121, p. 42. 1867–8). Published without description. Carrière (Revue Hort. **1875**: 131. 1875) published and described *W. arborea purpurata*. Vigorous, leaves large, oval-cordate, vilous; flowers large, deep red in all parts, outside and inside.
- 'Purpurea' \* (Baudriller, Gennes (Maine-et-Loire), Fr., Cat. p. 146. 1880). Published without description.
- 'Purple Leaved'. Best regarded as a commercial synonym used in the U. S. for 'PURPURATA'.
- 'Richesse'. A name misapplied to *Weigela* by several U. S. Nurseries and found in several gardens. The name can be traced back to Lemoine where it was applied to a cultivar of *Hydrangea* (Lemoine & Fils, Nancy, Fr., Cat. 191, p. 18. 1918).
- 'Robusta'. A name used in the Plant Buyers Index, 3rd. ed. p. 182. 1931; however, the reference given cannot be verified.
- 'Rosa Strauss' (Späth, Späth-buch 1720–1920, p. 233. 1921). A commercial synonym for 'BOUQUET ROSE' given as *W. praecox* Rosa Strauss.
- 'ROSABELLA' (Broertjes, Jaarb. Proef. Boomk., Boskoop, Netherl., p. 70. 1958). Growth stout and lax, flowering copious, flowers pink. A cross of 'Eva Rathke' and 'Newport Red'. Schneider published a full description in 1963 (Nederl. Dendr. Ver. Jaarb. **22**: 70).
- 'Rosalie' (Jung Seed Co., Randolph, Wisc., Cat. p. 16. 1960). Published without description.
- 'Rose Mallot'. Used by many U. S. nurseries for 'GUSTAVE MALET'.
- 'Rosea'. The species *W. rosea* Lindl. has been referred to the synonymy of *W. florida*, however "rosea" is commonly used in current literature as a cultivar name with or without a specific designation.
- 'Rosea Folia Purpurea' (Chenault et fils, Orleans, Fr., Cat. p. 18. 1919–20). Variety with purple foliage; numerous flowers of a pure rose color. Probably same as 'Purpurea'.
- 'Rosea Multiflora' (Späth, Späth-buch 1720–1930, p. 320. 1930). Horticultural origin. Flowers bright rose with white-spotted margin.

- 'Rosea Nana Variegata' (Van Houtte ex Späth, Späth-buch 1720-1920, p. 233. 1921). Small shrub with uniform golden to white-edged leaves. Flowers medium sized, bright rose.
- 'Rosea Purpurea' (Homestead Nurs., Boskoop, Netherl., Cat., 1954). Published without description.
- 'Rosea Purpurescens' (Bonnell Nurs., Seattle, Washington, Cat. 13, p. 20. 1956). Dwarf shrub to 3 feet tall, compact and bushy with profusion of pink flowers in early summer and purplish foliage all season.
- 'Rosea Sieboldi Variegata' (Hesse Baumsch., Weener-Ems, Germ., Haupt-Kat. p. 102. 1929-30). Flowers bright red, plant with beautiful white-spotted leaves.
- 'Rubra' \* (Carrière, Revue Hort. **1864**: 278. 1864). Published without description.
- 'Rubra Aureo-Marginata' (Hesse, Baumsch., Weener-Ems., Germ., Haupt-Kat. p. 102. 1929-30). Leaves distinctly yellow edged.
- 'Rubra Flava' (Clibrans Ltd., Altringham, Engl., Cat. 1935). Published without further description.
- 'Rubra Folia Marginata' (Dieck, Zöschen, Germ., Haupt-Cat. p. 33. 1885). Cited under *W. hortensis* without further description.
- 'RUFA' (Carrière, Revue Hort. **1876**: 400. 1876). A seedling plant with young leaves a deep russet-iron color becoming greenish red.
- 'Sanguinea' (Daisy Hill Nurs., Newry, Irel., Cat. 101, p. 124, undated). Cited as "*corensis sanguinea*," very bright red, dwarf, free habit, good.
- 'SATURN' \* (Waterer, Sons & Crisp, Ltd., Bagshot, Engl. Cat. 1892-93). Large, open flowers of a bright carmine red, deeper than 'Eva Rathke'.
- 'Saturne'. A misspelling of 'SATURN'.
- 'Schmuck der Gebüsche' (Späth, Späth-buch 1720-1920, 233. 1921). A commercial synonym of 'GLOIRE DES BOSQUETS'.
- 'Schneelawine' (Späth, Späth-buch 1720-1920, 233. 1921). A commercial synonym of 'AVALANCHE'.
- 'SÉDUCTION' \* (Lemoine & Fils, Nancy, Fr., Cat. 170, p. viii. 1908). Very floriferous plants, flowers carmine red.
- 'Siebold Silver Edge'. A commercial synonym in the U. S. for 'Siebold Variegata'.
- 'Siebold Variegata' \* (Van Houtte, Ghent, Belg., Cat. 180 A, p. 54. 1878-79). Published without description.
- 'Sieboldi Alba-marginata' (Bailey, Cycl. Amer. Hort. 483. 1900) = 'Siebold Variegata'.
- 'Sieboldii'. Misuse of 'Siebold Variegata' by French nurseries.
- 'Sieboldii Folia Argenteo-marginata' (Baudriller, Gennes (Maine-et-Loire), Fr., Cat. p. 146. 1880) = 'Siebold Variegata'.
- 'Silver-edge'. A commercial synonym in the U. S. for 'Siebold Variegata'.

- 'Simmondsii'. A misspelling of SYMONDSII'.
- 'Sinica'. A misuse of *Weigela japonica* var. *sinica*.
- 'Souvenir de Billiard' (Pép. F. Delaunay, Angers, Fr., Cat. p. 19. 1913-14). Published without description.
- 'Souvenir de Van Houtte' (Anon., Gard. Chron. III. 15: 752. 1894). Plant with large, open rose-colored flowers. Probably equal to 'Memoire de Mme. Van Houtte' of Lemoine.
- 'Spectabilis' (R. B. Parsons & Co., Flushing, New York, Descr. Cat. p. 14. 1873). Published without description.
- 'Splendens' (Carrière, Revue Hort. 1853: 310. 1853, and Fl. Serres 8: 292. 1853). A taxon of *Diervilla* not of *Weigela* as often reported.
- 'SPRINGTIME' \* (Clarke Nurs., San Jose, Calif., Garden Aristocrats 11: 15. 1944). Introduced as Le Printemps but proved to be distinct. Very handsome, vigorous, erect shrub with flowers rose on the outside, flesh colored within the corolla, lobes nearly white.
- 'Steltzner'. A misuse in U. S. of 'Stelzneri'.
- 'Stelzeneri'. A misspelling originated by Carrière and repeated by many nurseries for 'Stelzneri'.
- 'Stelzneri' \* (Van Houtte, Fl. Serres 14: 142. 1861). The reference to Van Houtte Catalogue 87 cannot be checked. Buds blood-red, flowers expanding, red-purple in color, large, well rounded, the most floriferous of the Weigelas.
- 'STRIATA' (Van Houtte, Fl. Serres 14: 143. 1861). Corolla streaked with white and spotted with blood-red.
- 'Stricta' (Carrière, Revue Hort. 1864: 278. 1864). A misspelling of W. 'STRIATA' subsequently used by many nurseries.
- 'STYRIACA' \* (Klenert Cat. 1908, according to Moelers Deutsch. Gärtner-Zeit. 296. 1912). Fast growing plants with numerous trusses of carmine-colored flowers.
- 'SYMONDSII' \* (Parsons & Sons Co., Flushing, New York, Descr. Cat. p. 52, not dated but possibly 1887). Rose and white flowers, distinct and beautiful. Published as *Weigela rosea* Symondsii.
- 'Syriaca'. A common misspelling of 'STYRIACA'.
- 'Sulphurea' (Zabel in Beissner et al., Hand. Laubh.-Benenn. 465. 1903) = 'GRANDIFLORA SULPHUREA'.
- 'Superba' (Lemoine & Fils, Nancy, Fr., Cat. 128, p. 15. 1894). Published without a description as *W. arborea superba*.
- 'TALL RED' (Woodcock Nurs., Ridgefield, Connecticut, Cat. p. 29. 1961). Plants reaching six or eight feet; flowers garnet red.
- 'TENIERS' (Lemoine & Fils, Nancy, Fr., Cat. 97, p. 27. 1884). Very large, well-opened flowers of a wine-red color.
- 'Van Houtte'. Misuse of 'VAN HOUTTEI'.

'VAN HOUTTEI' \* (Van Houtte, Fl. Serres **14**: 143. 1861). Flowers carmine colored washed with rose, the large mouth pure white, the interior lilac violet. Published as *Weigela Van Houttei*.

'Vanhouttei'. A misuse of 'VAN HOUTTEI'.

'VANICEK' \* Taxon registered with the American Association of Nurserymen in 1949 by V. A. Vanicek as the originator and introducer. Developed in Newport, Rhode Island, 1920. "More upright than 'E. Rathke', hardier, flowers larger, lighter red color and flowers on the young wood." See 'NEWPORT RED'.

'Vaniceki' \* (Cherry Hill Nurs., Newburyport, Mass., Cat. p. 38. 1939). Vigorous grower, red, flowers over a long period. An improved 'Eva Rathke'.

'Vanicek's Ruby-Red' (Coles Nurs., Painesville, Ohio, Cat. Spring 1943). Finest new red, extremely prolific.

'Vaniczeks Red'. A misspelling in many European nursery catalogues for 'VANICEK'.

'VARIABILIS' (Carrière, Revue Hort. **1876**: 340. 1876). A seedling of *W. hortensis* noted for the diversity of flowers which open white and become deep rose-red. Published as *Weigela variabilis*.

'Variegata' (A. Waterer, Knap Hill Nurs., Woking, Engl., Cat. p. 55. 1870). Given as *W. amabilis variegata* without further description.

'Variegata' (Bean, Trees & Shrubs Brit. Is. **1**: 490. 1914). Given as *W. florida* var. *variegata*. A good variegated shrub, leaves edged with pale yellow; flowers a deep rose.

'Variegata' (Hillier & Sons Nurs., Winchester, Engl., Wartime Cat. p. 14. 1939-40). Given as *W. praecox variegata*. Foliage variegated green with deep-golden edging; rose-colored flowers with yellow at the throat.

'Variegata Nana' \* (Bean, Trees & Shrubs Brit. Is. **1**: 490. 1914). Given as *W. florida* var. *variegata* forma *nana*. Dwarf with leaves edged with creamy white and flowers very pale rose.

'Variegata Purpurea'. A name applied to plants in several European gardens. No publication or reference has been encountered.

'VENOSA' \* (Carrière, Revue Hort. **1868**: 240. 1868). A selection of *W. rosea* made by Billiard, Fontenay-aux-Roses. Plants vigorous, flowers numerous, deep rose outside, less so inside but streaked with white on both surfaces. Published as *Weigela venosa*.

'VENOSA VARIEGATA' \* (Lemoine & Fils, Nancy, Fr., Cat. 88, p. 24. 1881). An interesting new variety with leaves streaked with white.

'Venus'. Cited in the Plant Buyer's Guide, 5th ed., p. 258, 1949. However, the reference is erroneous.

'Venusta' = *W. florida* (Bunge) DC. var. *venusta* (Rehd.) Nakai.

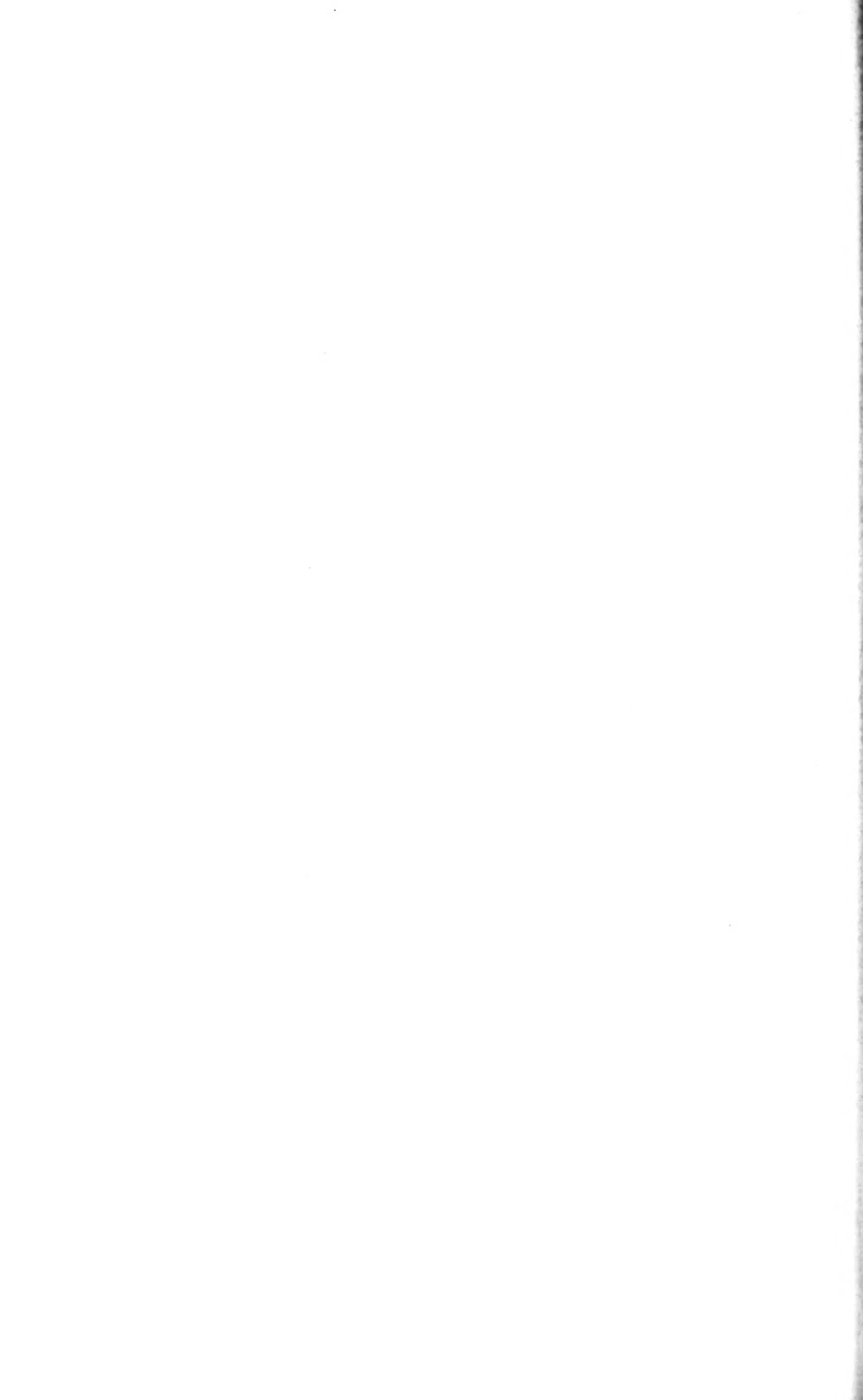
'Verschafelti'. Misspelling of Verschaffeltii.

'Verschaffeltii' \* (Van Houtte, Ghent, Belg., Cat. 170 QQ, p. 57. 1876-77). Published without description.



- 'Versicolor' \* (Van Houtte, Ghent, Belg., Cat. 117, p. 13. 1867). Given as "arborescens versicolor" without description.
- 'Versicolor Folia Argenteo-marginata' (Chenault & Son, Orléans, France, Gen. Cat. p. 22. 1912-13). Leaves margined with white.
- 'Versicolor Folia Marginata' (Lemoine & Fils, Nancy, Fr., Cat. 130, p. 30. 1895). Given as "amabilis versicolor foliis marginatis" without further description.
- 'VESTALE' \* (Lemoine & Fils, Nancy, Fr., Cat. 182, p. 5. 1912). One of the best of the early flowering forms, flowers presented horizontally, pale cream colored and these do not discolor.
- 'Viger'.\* A USDA plant introduction PI 137017 from Pépinières Bocard, Petit Saconnier, Geneva, Switzerland. No other published record available.
- 'VIRIDIS VARIEGATA' (Hesse Baumsch., Weener-Ems, Germ., Haupt-Kat. p. 55. 1908-09). Published without a description. The catalogue of 1932-33 states the foliage is of variegated green.
- 'VOLTAIRE' (Lemoine & Fils, Nancy, Fr., Cat. 90, p. 4. 1882). Flowers very large, tube swollen, red-purple inside, wine-red, wide mouthed, yellow on the lower part of the corolla outside.
- 'Vorläufer' (Späth, Späth-buch 1720-1920, 233. 1921). A commercial synonym for 'AVANT-GARDE' given as "praecox Vorläufer."
- 'WATERER'S RUBY' \* (Waterer, Sons & Crisp, Ltd., Bagshot, Engl., Rhododendron et al. Cat. 1928-29, p. 43). New improvement on 'Eva Rathke', rich ruby-red trumpets. Raised at Bagshot, England.
- 'Weisse Dame' (Späth, Späth-buch 1720-1920, 234. 1921). A commercial synonym for 'DAME BLANCHE' of Lemoine.
- 'Weisse Flagge' (Späth, Späth-buch 1720-1920, 234. 1921). A commercial synonym of 'PAVILLON BLANC' of Lemoine.
- 'Wilsonii' (Rich & Sons, Nurs., Hillsboro, Oregon, Cat. 1948). Published without description.

RICHARD A. HOWARD







# ARNOLDIA



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## THE NAME JASMINE

**F**EW plant names have become so widely used as jasmine: rose perhaps, and lily, with such extensions as primrose and calla-lily, and possibly a few others, but probably no other name which is predominantly tropical in its associations.

According to the authorities, it traces its origin from the Arabic and Persian "Yâsmin" or "Yasaman", so we may assume that the plant first known by this name was probably the Arabian jasmine, or to give it its botanical name as well, *Jasminum Sambac*. Native to tropical Asia, it has been cultivated there for centuries, and must have been introduced to Persia long ago. The epithet *Sambac* is itself an ancient Indian name for the species.

The spelling most commonly met with is jasmine, but almost as common is jessamine, with gessamine and jasmin as variations, and, even, jessamy and jeshamy, not to mention those in other languages.

The genus *Jasminum*, to use the variant which is correct in botanical Latin, contains about 200 different species and is mostly tropical in distribution. However, a few species can stand a limited amount of frost. *J. officinale*, the poet's jasmine which, incidentally, in the matter of botanical nomenclature, is the type species for the genus, is perhaps the best known, with its profusion of sweetly fragrant white flowers in summer. Closely related is the tropical and subtropical *J. grandiflorum*, the Spanish or Catalanian jasmine, and one may speculate that its association with that part of the world is due to its having been introduced to cultivation in the West by the Moors. Be that as it may, it is cultivated commercially in the south of France, and elsewhere, for the production of oil of jasmine, the basis or constituent of so many perfumes, an extract from the freshly picked flowers. In India, oil of jasmine is also obtained from *J. multiflorum* and *J. Sambac*, while in southern China the flowers of this latter species are used for flavoring tea, the well known and fragrant jasmine tea. Today, *J. Sambac* is even grown on a small commercial scale in Hawaii, where the unopened flower buds are gathered for fragrant leis. The Hawaiian name is *pikake*, the peacock flower,

[ 71 ]



so named because of the fondness of Princess Kaiulani for both the flower and white peacocks.

But the name jasmine is not confined to plants of the botanical genus *Jasminum*. Perhaps the two other plants with this name which are best known are the Carolina-jasmine (in this case more usually written jessamine) *Gelsemium semper-virens*, and the Cape-jasmine or *Gardenia*. Carolina-jasmine is native to the southeastern U.S.A., and belongs to another botanical family, the *Loganiaceae*. It occurs in woods and thickets and is a twining, high-climbing, shrubby plant which produces deliciously fragrant yellow flowers in the spring. Nor is its association with the name jasmine confined to its common name, for the Latin generic name *Gelsemium* is itself derived from the Italian name for the true jasmine, *gelsomino*.

*Gardenia jasminoides* clearly carries an allusion to the jasmine in its specific epithet, which means "jasmine-like", however the genus *Gardenia*, widespread in the tropics of the Old World, is not related. The Cape-jasmine is a native of South China and not South Africa as the name suggests, a good example of how the earliest plants introduced direct from China, round the Cape of Good Hope, long before the Suez Canal was cut, were often attributed to the area of the Cape (while the converse, where South African plants were attributed to the Far East, also occurs). The name *Gardenia* commemorates Dr. Alexander Garden (1730-1791), a native of South Carolina who took his medical degree in Scotland, and was a professor at King's College, New York, the forerunner of Columbia University. Not hardy in areas subject to frost, it is nevertheless widely grown as a conservatory plant, and cherished for the sweet fragrance of its flowers. In fact, as with *Gelsemium*, it is the scented flowers which have brought the name jasmine into use.

In 1583 we find the early botanist Cesalpino referring to the French lilac as *Jeseminum caeruleum Arabum*, and quite early on, lilac and mock-orange came to be called jasmine, but although the names of these two plants are still confused, at least in English speaking countries they have almost lost the general association with jasmine, except that on rare occasions one may still find the Persian lilac referred to as the Persian jasmine (a full circle of confusion, considering that jasmine was originally a Persian name anyway). Often, when a change in the botanical name of a plant has caused annoyance, one may hear it suggested that common names are better and more stable, but they may be too stable. The case of these three different plants is a good example. The mock-oranges are often called syringas while the lilac bears *Syringa* as its botanically correct generic name. A mix-up that goes back to the earliest use of the name syringa and shows how the usage of names persists over centuries; *Syringa* has not been applied to mock-oranges in learned works since the 18th century.

A surprising number of plants in the periwinkle family, the *Apocynaceae*, bear the name jasmine. Crepe-jasmine is the name most usually given to the double

form of *Ervatamia divaricata* (or, as it used to be called, *Tabernaemontana*\* *coronaria*), a shrub which is commonly grown in the tropics and bears white, crepe-like flowers which are sweetly fragrant at night. Better known, perhaps, as it is also grown more frequently under glass in temperate regions, is *Trachelospermum jasminoides*, the Chinese-star-jasmine or Confederate-jasmine, a climber with opposite leaves and pure white fragrant flowers, a native of southern China. In tropical areas throughout the world it is also grown in the open and, judging from the number of specimens one encounters with the botanical name *Jasminum* attached to them, must often be confused with the true jasmines. That common names can be confusing is again borne out by those given to this species, for the name Confederate jasmine is also given to *Jasminum nitidum* and star jasmine (although without the epithet Chinese) is the common name for *J. multiflorum*.

Perhaps the best known of the plants in this family to which the name jasmine is sometimes applied is the frangipani or temple tree, *Plumeria acuminata*. It is native to tropical America but now planted throughout the tropics of the world, and famed for its sweet scent. Because it develops into a small tree and bears beautiful fragrant flowers it has also been called the tree-jasmine, while its sister species, the red frangipani, *P. rubra*, is occasionally referred to as the red-jasmine. Within this family, and less well known perhaps, are the Chilean-jasmine, *Mandevilla suaveolens*, a native of Argentina, and the poison-jasmine or bushman's poison, *Acokanthera venenata* of South Africa, both with fragrant white flowers.

Species of the genus *Cestrum* from the American tropics are often called jessamines. The day-blooming jessamine is *C. diurnum*, and the night-blooming jessamine, *C. nocturnum*, because one is sweetly scented by day and the other by night. However, the name night-jasmine has also been given to another plant, this time a native of India, *Nyctanthes arbor-tristis*, best known as the tree-of-sorrow. But neither of these should be confused with the jasmin-nightshade, *Solanum jasminoides*, for the common name here is a translation of the Latin and refers, not to any scent the flowers produce, but to its climbing habit and the profusion of white, somewhat jasmine-like, flowers it produces.

No attempt is being made to list every plant recorded in the literature, to which the name jasmine has become attached. It is almost endless, especially if one considers usage in French, German, Spanish and other languages too, but four further unusual examples may be of interest. Orange-jasmine is a name given to a species of *Murraya*, *M. paniculata*, a member of the orange family from tropical Asia with flowers which, in scent, resemble a jasmine, rather than orange-

\* There is, of course, no end to the ramifications that can be followed up when one is considering the usages and meanings of names, whether common or botanical, but it is worth digressing for a moment, perhaps, to consider this rather unwieldy but euphonious name *Tabernaemontana*. It has its origin in the days when scholars regularly latinized their names and Jakob Theodor of Bergzabern (c. 1520-1590), physician and early botanical author of Heidelberg, took his name from that of his town when latinized, i.e. *Tabernaemontanus*. Later the genus was named in his honor.

blossom. Jasmine-tobacco is apparently used on occasion for *Nicotiana alata* var. *grandiflora* (*N. affine*) and blue-jasmine is the sweet scented, blue flowered, *Clematis crispa*, native in the southeastern U.S.A. Lastly, the rock-jasmine bears no resemblance to the true jasmine apart from the particular odor of its flowers. The rock-jasmines comprise the herbaceous genus *Androsace*, and are native to high mountain areas throughout the northern hemisphere. One of the best known species is *A. Chamaejasme*, whose epithet means "dwarf" or "ground jasmine".

Finally, mention may be made of a few botanical names which incorporate the name jasmine. *Jasminanthus* is a later synonym for the sweetly fragrant and very popular *Stephanotis*; *Jasminochyla*, in the periwinkle family, is a small genus closely related to *Landolphia* and, in the same family, *Jasminonerium* is a synonym of *Carissa*; *Jasminoides* is a synonym of *Lycium*, the matrimony vines, many of which are sometimes called false jasmine, especially in France; while a small genus of cacti, endemic to the remote Galapagos Islands, has been named *Jasminocereus*.

Such a diverse array of plants have come to be associated with the name jasmine, and, although it appears that the majority have tropical or subtropical associations and many are climbers, one may say that their general and most outstanding characteristic is the sweet, deliciously fragrant, scent produced by their flowers.

P. S. GREEN



In anticipation of its approaching 100th anniversary, the Arnold Arboretum is preparing a biography of Charles Sprague Sargent, the first director, and a history of the Arnold Arboretum. We would be grateful to readers who can suggest sources of letters written by Professor Sargent, or of material pertinent to the development of the Arboretum. Kindly address replies to Miss Stephanie Sutton, Arnold Arboretum, Jamaica Plain, Massachusetts 02130.



# INDEX TO VOLUME XXV Illustrations are in **bold face** type.

Abeliophyllum, 14  
**Abeliophyllum distichum**, Plate III, 15  
 Alaskan Ornamentals and Fruits, 9-12  
**Albizia julibrissin rosea**, germination of seed, Plate I, 4  
 Bonsai Available on Loan, An Exhibition of Photographs of, 28  
**Cercis siliquastrum**, germination of seed, Plate II, 6  
 Check-list of Cultivar Names in Weigela, 49-69  
 Chionanthus, 16  
**Chionanthus virginicus**, Plate III, 15  
**Cryptomeria japonica 'Lobbii'**, Plate IX, 43  
 Cultivar Names in Weigela, Check-list of, 49-69  
**Cunninghamia lanceolata**, Plate IX, 43  
 Dumps, Plants for Screening Junkyards, Gravel Pits and, 45-48  
 Exhibition of Photographs of Bonsai Available on Loan, An, 28  
 Fontanesia, 16  
 Forestiera, 17  
 Forsythia, 16  
**Forsythia ovata**, Plate III, 15  
 Fraxinus, 17  
**Fraxinus excelsior**, Plate IV, 18  
**Fraxinus ornus**, Plate IV, 18  
 Germination of Woody Legume Seeds with Impermeable Seed Coats, 1-8  
**Gleditsia triacanthos**, germination of seed, Plate II, 6; seed, Plate I, 4

Gravel Pits and Dumps, Plants for Screening Junkyards, 45-48  
**Gymnocladus dioicus**, seed, Plate I, 4  
 Herbarium Introduced, The, 37-40  
 Home Arboretum, A, 41-44  
 Jasmine, The Name, 71-74  
 Jasminum, 19  
**Jasminum multiflorum**, Plate V, 21  
**Jasminum polyanthum**, Plate V, 21  
 Junkyards, Gravel Pits and Dumps, Plants for Screening, 45-48  
 Ligustrum, 20  
 Mock-Oranges, The, 29-36  
 Name Jasmine, The, 71-74  
 Norohnia, 22  
 Olea, 22  
 Olive Family in Cultivation, The, 13-27  
**Ornamental Planting, Town Dump, Reading, Mass.**, Plate X, 47  
 Osmanthus, 23  
 × Osmarea, 23  
**Phellodendron amurense**, Plate IX, 43  
**Philadelphus 'Albatre'**, 32; Plate VII, 33  
 — 'Argentine', 32  
 — 'Aureus', 32  
 — 'Avalanche', 32; Plate VII, 33  
 — 'Bannière', 34  
 — 'Belle Etoile', 34  
 — 'Boule d'Argent', 34  
 — 'Bouquet Blanc', 34; Plate VIII, 35  
 — 'Burford', 34



Philadelphus 'Cole's Glorious', 34  
 — 'Conquête', 34  
 — coronarius, 31  
 — 'Erectus', 34  
 — 'Fleur de Neige', 34  
 — 'Frosty Morn', 34  
 — 'Girandole', 36  
 — 'Glacier', 36; Plate VIII, 35  
 — incanus, 31  
 — 'Innocence', 36  
 — inodorus, 32  
 — laxus, 32  
 — 'Minnesota Snowflake', 36  
 — 'Mont Blanc', 36  
 — 'Norma', 36  
 — 'Perle Blanche', 36  
 — purpurascens, 32  
 — schrenkii jackii, 32  
 — × splendens, 32  
 — 'Virginal', 36  
 Phillyrea, 23  
 Photographs of Bonsai Available on  
 Loan, An Exhibition of, 28

Picconia, 24  
 Plants for Screening Junkyards,  
 Gravel Pits and Dumps, 45-48  
**Quercus myrsinaefolia**, Plate IX, 43  
 Schrebera, 24  
 Screening Junkyards, Gravel Pits and  
 Dumps, Plants for, 45-48  
 — Shrubs for Dry, Sandy Soils, 46  
 — — — Normal Soils, 48  
 — Trees for Dry, Sandy Soils, 46  
 — — — Normal Soils, 48  
 Seed Coat Dormancy, Methods of  
 Overcoming, 2  
 Syringa, 24  
 — **amurensis**, Plate VI, 25  
 — × **prestoniae 'Isabella'**, Plate VI,  
 25  
**Town Dump, Reading, Mass., Orna-**  
**mental Planting**, Plate X, 47  
 Weigela, Check-list of Cultivar Names  
 in, 49-69



